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BY-WAYS

OF

NATURE AND LIFE

BY

CLARENCE DEMING

G. P. PUTNAM'S SONS

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THE chapters of this volume, having already appeared over the initials of the author in the columns of the *New York Evening Post*, need no formal introduction to the readers of that journal. To other readers, who see these sketches now for the first time, it may be explained briefly that they have been penned in out-of-the-way places of nature and life, during trips on two continents, extending over three years of time and some eighty thousand miles of distance. Often composed during the hurry of travel or of transitory sojourn, they must crave the reader's kindest indulgence for not a few errors of form and, it may be, some errors of fact. If, for the faults of the volume, any variety or freshness of its themes shall compensate, the writer's largest hopes will be abundantly fulfilled.

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By-ways of Nature and Life.

THE BOWERY OF LONDON.

A WIDE street, like an artery of the human body, cuts the map of London in that part which represents the northeastern region of the great city. Like so many of the London thoroughfares, it changes its name several times without shifting its general direction, becoming in succession Whitechapel Road, Mile End Road, and The Bow. In times long gone by it was the old Essex Turnpike, and at its suburban extremity pleasant dwellings and neat door-yards still resist the crush of city growth and the ambition of trade. But at the Whitechapel end the street may almost be called the aorta of London. Through it by day the city life pulsates and reflows. By night the human tide is drawn from the slums of East London into the great street as naturally as the low life of the east side of New York drains into the Bowery. Whitechapel Road is reached from Regent Street or the Strand by a number of omnibus lines which pass the Bank of England, go by the great financial houses of Cornhill and Leadenhall Street, and pass also Hounds-

ditch, where the Jews' Old Clothes Exchange, with its admission fee of a penny, well repays a visit. The stretch from the high life of the West End to the low life of Whitechapel is not more than three miles; yet the American tourist rarely makes the trip, and to most of our London visitors the very name of the curious street will be unfamiliar. I doubt whether a single London guide-book ever mentions the huge thoroughfare as one of the city sights. For all that it is not less a curiosity, a spectacle, and a wonder never forgotten when once seen, and never studied without expanding into fresh realms of lowly human life, teeming with things curious, strange, and sad.

For visiting Whitechapel Road one can choose any pleasant evening, but Saturday night is best, when the humble denizen of London not only exults in the impending holiday, but must hie him out-of-doors to get provision for Sunday, when the shops will be closed. Take an omnibus, mount to one of its twin top seats far above the madding crowd of the Strand or Oxford Street, and let it bear you through the whirl, and rush, and gleaming lights of West London to your destination. In twenty minutes one reaches the Bank and the financial centre of England, by daylight congested with business, but now at night dull as a village green. A little way beyond the crowds begin to increase. It is an altered crowd too in dress and bearing from that left behind in the west city. Shops begin to appear anew and low drinking-places to multiply. These latter bear a different set of titles from the liquor

shops of fashionable London. "The Mitre," "The Crown," "The Swan and Eagle" of the West End are succeeded by "The Blind Beggar," "The Jug and Decanter," "The Plug," and "Eel Pie House," of the humbler Whitechapel region. Then we enter the great street itself, at first narrow, but in a few blocks widening to its full proportions. And what a street! It is two hundred and fifty or three hundred feet wide, say three or four times the width of the Bowery of New York. On each side are foot-pavements which dwarf those of the Paris Boulevards, twenty-five to sixty feet wide, each of them broader than most of the London thoroughfares. The sidewalk on the right going out Whitechapel is comparatively deserted, and most of its crowd is turned toward the broader pavement on the left. Along the exterior side of this foot-pavement, which is more like a street than a sidewalk, hucksters are allowed space without paying license. The effect is to convert one side of the broad Whitechapel Road into a new street or market-place three quarters of a mile long, with the solid structures on one side, the hucksters' booths on the other. Between flows a vast current of human beings, nine tenths from the baser classes, and so big and incongruous that it seems as though low London had but one outlet, and that Whitechapel. To see this crowd alone is worth the trip to Whitechapel and back. The very size and the resistless sweep of the torrent of humanity give an impression of power and dignity which is only lost when one mixes with the mass and sees its vile elements.

Words are tame to describe the fantastic brilliancy of the scene. It is Vanity Fair by gas-light, only a Vanity Fair far more varied, grotesque, and big than that in Bunyan's allegory. On the one side are the shops, using the name to designate the places where every thing, including character, is sold. Bakeries, stores, markets, mix side by side with low concert-rooms, billiard-halls, and grog-shops. At intervals dark alleys lead behind to deeper haunts of vice or misery. Here and there is a small chapel or a little hall opened for nightly prayer-meetings by some of the Christian associations of London; for the city missions justly recognize that in the Whitechapel quarter is at once the fairest and foulest field for Christian endeavor. In front of one of the humble places of worship often stands a street preacher addressing a group of hearers who are more curious than reverent. Sometimes he is a man singularly gifted with rude eloquence and the power of whose rough phrase and crude pathos puts to shame the rhetoric of more finished orators. Over all this medley of trade, vice, and religion shine the brilliant gas-jets from the shops, meeting half-way the lurid glare from the petroleum torches of the hucksters across the walk, and through the gauntlet of light pours the endless crowd.

The booths of the hucksters and cheap Jacks reach along the outer edge of the sidewalk for a distance of half or three quarters of a mile. A few shillings will set any one up for business in this Acheron of trade.

It is hard to say whether wonder or pity predominates at sight of the infinite forms of catching a penny by traffic or trickery. Every thing sold is of tenth-rate quality, and it goes without saying that every thing imaginable is sold. The old junk booths seem to represent the prevailing type of traffic. One can buy in them every conceivable article of small hardware, from a shingle-nail up to a coffee-mill, but every thing is rusty, weather-beaten, or broken. Next to the junk shop, it may be, comes a vendor of cast-off tooth-brushes, "One for a penny, three for tuppence." A roaring quack is next in line, crying up his panacea for tapeworms and exhibiting a ghastly bottled array of the creatures. His companion sells old pieces of sole leather or boots and shoes which look as if their own weight would break them down. Move on a few feet. Here is a shooting gallery on an original plan. There is space only for a range about five feet long, so that every thing except the gun, is reduced to correspond. You hold the muzzle of the firearm within a foot of the target, but you are expected to hit a bull's-eye of the size of a pea with a ball like a small bird shot. A little farther on comes the "cocoa-nut game" in full blast. The proprietor has put up a wire alley twenty feet long and ten feet wide. At one end are equi-distant and upright rows of cocoa-nuts, say two feet apart, made by mounting the nuts on sticks of different heights. You pay a penny apiece for wooden balls and get two pennies for

each cocoa-nut knocked down. To the eye it seems as though the veriest tyro could hit a nut at every shot. Try it! You will find that throwing with horizontal arm the three nuts in each upright row are almost as hard to hit as though the three nuts were one, and that the shrewd proprietor has not arranged them thus to lose money. Your pennies melt away like copper in a crucible, and you leave with more experience and less small change. Here, too, are the electric batteries, the tests of hitting, smiting, throwing, and other devices familiar to summer visitors on Coney Island. There are for sale old clothes, torn umbrellas, rotten dry-goods, decayed fruit, books, as immoral within as they are dirty without, archaic fish and oysters, to whose lasting quality in a sense the writer can testify from actual experience. You eat one at night and you taste it until next morning. But why proceed? As well try to list the articles in the Chatham Street shops or catalogue the truck thrown annually into the East River.

And then the theatres of this lowly region! They are many in number, but of one invariable kind—the variety show; and they give variety with a vengeance. By the side of them the extinct Old Bowery ranked as a temple of High Art, and its vilest tragedies were fairly Shakespearian. I recall a visit to one of these playhouses of the Whitechapel precinct. By a long and devious passage, and borne in by a surging throng of street Arabs, we reached the interior of the theatre, behind the row of

houses facing the street. For one and sixpence (thirty-six cents American money) we secured the chief box, giving a proscenic view of the stage, and a still better point whence to observe the unique show in front. A curious scene it was. The begrimed theatre was filled with about two thousand people. The single gallery slanted from the shadowy rafters down almost to the stage, looking like a quarter-section of a big Roman amphitheatre. An actor at the footlights could almost have shaken hands with the small boys in the front gallery row. Below the gallery the seats reached back from the dingy orchestra until lost in the fog of all-pervading tobacco smoke. The audience—one part female, two parts men, and ninety-seven parts street-boys—was kept in quasi order by a cohort of censors in faded uniforms, called "chuckerouts" by the youngsters, from their proclivity for "chucking out" too unruly lads. Indeed, one of our prime diversions at the show was the "Look sharp! The chuckerout 's got his eye on ye!" piped every now and then from the mist that clouded the rear of the auditorium. It cost a penny to be a gallery god, and twopence to get into the alleged "choice" seats of the orchestra circle in this Temple of Thespis. The youngsters got their money's worth. The programme advertised some forty events, and the performance lasted from seven o'clock till early morning—making one think of the Chinese play which Artemus Ward describes as beginning with the birth of the hero

and continuing several months until he is killed or married.

The writer remembers vividly a characteristic and funny episode at this theatre some years ago. The long play of the evening was a sanguinary version of the "Old Curiosity shop" of Dickens, and by a common stage paradox the part of the villain Quilp had been given to the only really good actor in the cast. How in the world this man, whose acting would have done credit to a leading part at Wallack's, ever got among that crowd of fifth-rate actors is hard to imagine. Perhaps he was a new theatrical luminary first rising on the Whitechapel horizon, or more likely a good actor whose bad habits had driven him from the West End stage. However, there he was, acting a realistic villain among stage blockheads, a veritable martyr surrounded by sticks. But his intense realism was unpopular with the boys, and as the play went on he became the bugbear of the piece. He played too well for the youngsters, who were so carried away by his vivid portrayal that they began to think he was a villain in dead earnest. Every time he appeared a torrent of hisses, cat-calls, and hoots met him, and when at last, with his meshes all drawn around his victims, he exulted in his triumph, the howls rose to such a pitch that it looked as though Quilp would be a crushed tragedian. The "chuckerouts" had a lively time of it for a while, but at last restored order by decimating the audience. The play proceeded, and Quilp went to the final destiny of all stage villains amid shrieks of approving delight.

Another of the Whitechapel theatres is as large as the foregoing playhouse, but higher priced and better toned. Here the "chuckerout" is superseded by a beefy presiding officer at a table in front of the orchestra. He bellows out the entries on the programme, and in the intervals divides his time between big mugs of ale and lusty thumps with a gavel. Barring his dress coat, he looks for all the world like the chairman of a Tammany primary; and as a presiding officer, so far as keeping order is concerned, is quite as signal a failure.

But there are rifts even in the gloomy shadows of life along Whitechapel. One night there was advertised in large print a stereopticon lecture on "America." A penny gave us admission to a rough building with rougher seats, where a thousand or more from the humble classes had gathered. The lecturer in the darkened room took his audience with him on a trip from New York up the Hudson, thence across to Niagara Falls, and then to Washington, illustrating each point of interest with views on the canvas. Suddenly, while describing the Capitol at Washington, he flashed upon the screen a picture of the statue of Abraham Lincoln. There was a momentary hush, then the first applause of the evening came forth like a burst of thunder. A more impressive scene followed when, without a word of announcement, the face of Garfield appeared on the screen. The crowd knew it instantly. They rose to their feet and gave it roar after roar of welcome, outburst succeeding outburst, so that

after several minutes the lecturer could scarcely proceed. The scene was one to be recalled for a lifetime—the dusky room, the swaying audience, the swelling plaudits, and this gathering from the very sink of London paying its tribute to our two martyrs. How sharply it carried memory back to the dark days of civil strife, when these humble men were with us and England's proudest against us! How it emphasized that more recent sympathy which went out to us from both England's highest and lowest when our second presidential martyr fell, suffered so long, and died! This was no formal demonstration, but a sincere and spontaneous burst of feeling from men who had no motive save to speak their hearts. Let us record it as something even more significant, and as a sign of that common sympathy which glows beneath the surface of two nations which are one in kinship, one in their civic liberty, and one in their aspiration toward the ideals of human progress.

CURIOSITIES OF ZOÖLOGY.

IF the American visitor to the London Zoölogical Gardens can make the rounds under the guidance of Mr. A. D. Bartlett, the old superintendent, he will find far more to instruct and amuse than the mere spectacle of the best collection of birds, beasts, and reptiles in the world. For fifty years Mr. Bartlett has been connected with the gardens, and for twenty years he has been the active superintendent. In the line of his duties he has been forced to make a special study of the habits of each creature, and his theoretical knowledge of natural history has been supplemented by a vast array of practical facts that have come directly under his eye. If his reminiscences of all the curious things which he has seen in the garden could be printed, they would fill a volume which would be no small addition to what we know already about animal life.

Outside of its spectacular quality the world-famous "Zoo" has been of great scientific value in two ways. Not only has it disclosed natural traits of the animals in their wild state, which had been unobserved and never would have been known unless the creatures had been kept in long captivity, but it has also shown animal traits peculiar to the captive condition. I can illustrate this by

a single example, itself one of the most curious facts brought out during the history of the garden. It has been found, as is commonly known, that the carnivorous animals, like the lions, tigers, bears, and even hyenas, can be readily tamed when brought to the gardens young, while the adult animals remain often fierce and untamable to the last. But the effect with certain of the vegetable-eating creatures—deer, goats, and wild sheep—has been precisely the reverse. If taken as adults they are shy and ready to fly at the least alarm; but when captured as fawns and reared they become savage and dangerous, a constant source of peril and fear to their keepers. Mr. Bartlett explains this by the following line of reasoning: The deer, for instance, in their wild condition, are naturally even more fierce than the carnivora, but have the trait of timidity when brought face to face with unfamiliar objects. Thus the bucks, though they shun man, will fight to the death with each other, and will stand at bay or attack instantly the smaller wild animals of prey. In the same way, when familiarized with man, their native fierceness asserts itself. They attack him fearlessly, and instead of being tamed by confinement, the restraint only serves to make them ferocious.

A similarly curious paradox has been observed at the gardens in the case of certain birds. The dove is the prescriptive bird of Eros and the poets. The budding Tennysons and Longfellows, however, who want to utilize the wealth of metaphor drawn from the soft cooings and

gentle dalliance of the birds of Venus, must keep away from the Zoölogical Gardens. It seems hard and harsh to upset at once the legends of mythology and the imagery of the verse-makers, but the rude fact must be asserted, that the dove, as shown by experience with many specimens of his tribe at the "Zoo," is any thing but a well-behaved bird. Besides other bad habits, he is a vindictive and relentless brawler, and during the love season is in constant warfare. Nature fortunately has not given him sharp and fatal weapons, but with the joint of his wing he can strike a blow of amazing force and precision. The mellow cooing which the poets ascribe to affection is, far more likely, a challenge to combat than a gentle note of love. But, on the other hand, certain birds of prey—the eagle, the vulture, and the buzzard—to which we attribute all the vices, become in captivity at the gardens most staid and reputable birds, dwelling together in harmony and giving no trouble to their keepers. They cannot change their diet, but they succeed in establishing a character for domesticity and good behavior that some of their more reputable companions would do well to emulate.

Out of a dozen curious stories that could be told about the nimble denizens of the monkey-house, let me select two, both connected with apes that have now gone to the happy peanut-ground of monkeys. A chimpanzee named "Joe," who came to the gardens some years ago, used to be kept in a separate compartment of the big cage. Every

morning his keeper used to let Joe out for an airing, and the little fellow was the terror of his mates, leaping like a flash around the outside of the cage, pulling their tails, and abusing his liberty in the most shameful fashion. By and by came the hour when the visitors began to arrive and when Joe had to be shut up again in his cage. Then Joe would rebel. He refused to come to his keeper, Mr. Sutton, who might as well have tried to cage the lightning as catch by ordinary means the nimble rascal leaping over the outside of the big monkey-cage. No blandishments or dainties would allure crafty Joe, who, sitting high on the upper bars, would make the most horrible grimaces at his pursuer. But Joe, though of male gender, had two feminine failings—curiosity and fear; and these were used to foil his cunning. Near one end of the monkey-house was a large dark hole out of which came a gas-pipe. Having first set open the door of Joe's compartment, Mr. Sutton would approach the dark hole, peering in as if he saw a ghost. Joe would instantly stop his contortions, descend from the cage, follow behind Mr. Sutton, and, like him, look earnestly into the hole. Then, with a sudden movement, as though the apparition were emerging, Mr. Sutton would retreat, making every gesture of fear. Instantly Joe's courage and wits would forsake him. Chattering with fright he would fly to his cage for refuge. The door was shut and he was a captive anew. The most singular feature of it all was that Joe never seemed to learn the trick. It was repeated day after day for many months and with unvarying success.

One of the by-gone heroines of the monkey-house, "Miss Jenny," also died some years ago. She came from India, and had a peculiar parting of the hair upon the head, marking her as of a new species, which gave the men of science a good deal of trouble to classify and name. Among Jenny's dissipations was one which Mr. Darwin never ought to have overlooked as a simian prototype of a later human vice. Other monkeys at the garden have gone through the motions of smoking, but Miss Jenny was the first that ever smoked a pipe full of real tobacco. She did it too with unction and enjoyment, and once she snatched a half-smoked cigar from the mouth of a visitor and coolly finished it. Sometimes she would take a bottle of ale, and, holding it with her hind foot in a position infinitely comic, drink down long draughts in the intervals between her puffs.

The chief of the singular birds at the "Zoo" is kept in a secluded cage, and can be seen only through the good offices of his keeper and a fee. His Latin name, particularly if it described half his accomplishments, would be so long that we pass it by and choose the more prosaic title of hornbill. It is a bird with a body much like that of the eagle, black and white in color. Its head is fitted with an enormous bill as large as the human hand, sharp-pointed and crowned with a horny plate as large as a butter dish. Mr. Hornbill's keeper takes his stand ten feet away and tosses grapes at the bird so rapidly that the human eye can hardly follow them through the air. But the eye of

the hornbill is quicker, and he catches them every one in his bill, now depressing it, now raising it in air, and again turning it sideways according to the angle at which the grape is delivered to him; and when half a dozen grapes are shot at him in succession as rapidly as the keeper can do it, the bird usually misses but one. If a grape were only a base-ball, the hornbill could give points to the best of our professional first basemen. The hornbill and toucan (which also has a huge bill, sometimes ten inches long) have a funny way of feeding from the ground. They pick up the food in the extremities of their bills; then, with a toss of the head, open the mouth, and the food describes the arc of a circle, falling into the gullet with absolute certainty. Some years ago under the hornbill's perch was found what looked like a fig enclosing a mass of slightly digested grapes and other food. It was supposed for a time that the bird had disgorged his own stomach. The fig-like mass was passed over to the dissector of the Zoölogical Society, and Mr. Hornbill was watched carefully for any ill effects. Presently the bird, which meantime had kept as well as usual, threw up its "stomach" again, and ere long the dissector reported that what seemed a stomach was only an inner lining formed by a thick secretion, the disgorging of which was a natural function of the bird. Soon after it was found that other birds in the "Zoo" had the same curious habit. It seems that the hornbill, of which there are altogether some six species living in Africa, Hindostan, and Burmah, have a

singular way of nesting, of which the habit above described is an incident. The male takes the female to a hollow tree. There the mother-bird builds a nest of her own feathers and lays her eggs. Then the male builds up the hole with clay, and keeps his mate a close prisoner until the eggs are hatched. In the clay is left a small hole, through which the female protrudes her bill, and the male bird keeps her well provided with dainties, gathering them in his stomach and then disgorging them in the pouch mentioned above. If the female breaks down the clayey barrier the male instantly kills her. During the period of incubation the labors of the male make him so weak and sickly that he often yields to any sudden change of weather, and dies. But the female waxes fat as a Thanksgiving turkey on her lord's devotion, and the natives often seek her out when on her nest and kill her as a great delicacy.

Other rare birds have shown their strange habits in the captivity of the "Zoo." A bird called the "greater vasa parrakeet" entered the gardens as an adult bird on the 30th of June, 1830, and has never touched water since. It is still in the best of health, and its case, and that of other birds at the gardens, prove conclusively that certain kinds of feathered creatures never need water to sustain life. A strange biped from Australia, the satin-bower bird, builds in the love-making season a platform and long gallery of twigs, adorned with shells, feathers, and brilliant strings. On their balcony the pair go through all kinds of queer

posturings and enact a kind of a bird love-scene of the Romeo and Juliet type. The darter, a bird from Florida, shaped like a heron, with a bill sharp as a needle, goes fishing in unique fashion. Let a small living fish be tossed in the tank, and the darter dives and swims for it under water. The fish goes like an arrow, but the darter like an electric spark. The bird overtakes the fish, stabs it with his sharp bill, slightly opened so as to hold the prey by a series of saw-like projections on the inner edges. Then the bird comes to the surface, tosses its prey into the air, catches it descending, and swallows it in a trice. The next-door neighbor of the darter is a penguin that rivals the Florida bird in the speed with which it swims under water, never using its webbed feet, but, instead, propelling itself with the paddles placed where the wings belong on an ordinary bird. All these are but a small fraction of the singular facts, many of them of scientific interest, disclosed by the bird life of the "Zoo."

The reptile-house, with its magnificent collection of snakes, one a python twenty-three feet long, has also its fund of incident shadowed by a single tragedy. Some years ago the keeper, when in liquor, took the cobra from its cage. The reptile bit him, and, spite of quick antidotes, he died in twenty minutes. In 1850 a boa-constrictor swallowed his blanket, and after holding it thirty-three days disgorged it. The careful scrutiny of the ways of the python and other snakes of the constrictor species sheds important scientific light on their habits of

preying. They invariably throw themselves from the tail, grasping with it a tree or rock. Having once seized the prey with their jaws, and thus secured what we may call a new fulcrum from the other end of the body, they proceed to constrict and kill. The alleged habit of salivating their prey is all moonshine. The story doubtless arose from the habit which the constrictors have of feeling the dead prey carefully with the nose so as to find the head and begin swallowing. In the paroxysms of hunger the constrictors are fierce and aggressive. If two of them at such a period happen to grasp the same rabbit or duck with which they are fed, the larger and stronger snake not only swallows the prey but also the smaller serpent, which is either unwilling or unable to let go its hold. This has the savor of fiction, but I am satisfied that the keeper who told it was not drawing the long bow. In fact, the Zoölogical Society has lost one or two valuable serpents in this way, and the keepers have to be careful in feeding the constrictors to avoid accidents of the sort. If both creatures seize the prey at once, the keeper instantly takes it away. The jaws of the constrictors are curiously formed, and apparently fall apart at the lower extremities when the reptile is gorging, a muscular contraction bringing the extremities back to place when the prey is swallowed. Among the more striking curiosities of the reptile-house, is a snake-eating serpent from India, for which the keeper has on hand a constant supply of young snakes caught in England.

The experience of the keepers at the "Zoo" has shown that there is a good deal of fallacy in the common belief that the good-will of animals is won by feeding them. Some years ago a new keeper was put in charge of one of the buildings containing large animals. The man was a sober and steady fellow, watchful of his duties, and giving careful attention to the feed and cleanliness of the brutes. But he utterly failed to conciliate them, and their aversion and anger when he entered their cages became the talk and wonder of the other keepers. Mr. Bartlett looked into the matter, as it is a cardinal point in the treatment of the brutes that they should be kept good-tempered and contented. The superintendent at last found out the secret. The keeper never talked to the animals, and as he could not learn to utter the expressive and kindly sounds which the animals love to hear, even though they do not understand the words, the man had at last to be dismissed. Mr. Bartlett never feeds the creatures, except now and then with a bit of biscuit or some other trifle. But he has the gift of kindly talk, and in consequence they many of them know him and come to his call as quickly as to the voice of their keepers. But no care or training prevents the animals from getting now and then into wicked moods. A female hippopotamus, a few years ago, after bringing forth three young, became so savage that it was feared she would tear her building into splinters. No keeper dared to enter her house, and the food and water supplied her through a

hole broken in the roof she refused to touch for days. The great African elephant "Jumbo," now of international fame, eleven feet high, weighing some ten thousand pounds, and probably the largest beast in the world, used to be tractable and pleasant when outside his house and carrying his load of children along the broad walk of the gardens; but in his enclosure he was often wicked and dangerous. The frequent repetition of these angry moods was the secret reason that induced the sale of the huge beast to Mr. Barnum. During a part of the year Jumbo had already shown signs of the approach of the period of elephant puberty, which is revealed by the secretion of a viscous fluid on a gland of the neck. This is a peculiarly dangerous crisis in the life of the elephant species. The animal for several months in the year becomes often almost mad. In India, at such a juncture, the keepers beat the poor brute pitilessly, or, confining him in large holes, starve him until the passion is subdued. Now and then one of these mad leviathans escapes and for weeks runs a deadly muck against man and beast. They tell at the "Zoo" a story of one of these "rogue" elephants—as they are locally dubbed in India—which in that country, some years ago, escaped from its herd. For weeks it kept a region as large as a British county in terror. Lurking at the edge of a jungle during the day it would rush out in the dusk upon some adjacent village, wrecking the flimsy habitations of the natives, slaughtering ruth-

lessly men, women, and children, and driving the fugitives in panic to the bush. Many and inventive were the snares contrived for the outlawed beast, but it showed the cunning which sometimes marks human insanity in eluding them all. After it had slain scores of people, this wild fellow one day, his period of madness having expired, returned quietly and took his old place in a tame herd. The marks of some two hundred bullet-wounds, none of which had been serious, were counted on his body. In selling Jumbo to Mr. Barnum, the theory of the directors of the "Zoo" was that fellowship with a large herd of elephants, together with the active travel of a circus, would avert the threatened humor; an hypothesis which the sequel has shown to be well founded.

The cost of the creatures in the "Zoo" varies in each species almost as much as the prices of horses, being fixed by the size, health, and perfection of each specimen. The hippopotamus heads the list, a good specimen well grown being worth from $8,000 to $10,000; a well-shaped elephant, full grown, can be bought for $2,000; a rhinoceros for about $3,000; a large python for $1,000; a tiger or lion for about $400 or $500; a bear from $250 to $500; a zebra for $1,500, and a good specimen of a giraffe for about the same sum. The chimpanzee leads the monkey tribe in value, costing about $250—the orang-outang and gorilla by their scarcity being ruled out of the list. On their triangular ground of seventeen acres the Zoölogical Society have now about four thousand specimens of the

various creatures, whose tastes are carefully catered to in the spacious enclosures, the neat and clean houses, and the weedy pools where their captivity is passed. Each year there are about 600,000 visitors to the gardens, or almost exactly the number that visit the British Museum, although admission to the latter is free, while the "Zoo" charges a shilling on all days but Mondays, when the price is sixpence. The best collection of living animals in the world can be seen at the "Zoo," therefore, for twelve cents. The yearly receipts of the Zoölogical Society from all sources are about $125,000, and the expenses about the same, but the accumulated value of its property during its fifty-seven years of existence is incalculable. It has gathered, along with its living curiosities, a select and costly zoölogical library. With no design of money-making, never declaring dividends, and finding its richest reward in the delight and instruction of the public, the society has reached a basis of prosperity as enduring as it is well deserved.

A BRITISH ELECTION-DAY.

ON the night of the third of March, eighteen hundred and eighty-two, there closed in the English city of Northampton an era of public ferment and uproar more violent than the oldest resident of the borough could recall in all its political annals. A week before, the government had issued its writ, calling for the election of a "fit and proper person" to represent the city in place of the famous radical, Bradlaugh, expelled from Parliament. That persistent agitator, who had already been "shuttlecocked," as the phrase went, between Northampton and the British Commons several times, presented himself once more as a candidate. After hanging long on the skirts of the Commons, refusing to take the oath recognizing a God, he had brought the controversy to a focus by boldly advancing to the bar of the House, and, Bible in hand, administering the oath to himself. This frightful breach of venerable tradition, and the consequent expulsion from the Commons, sent him back once more for vindication to his Northampton electors, and Edward Corbett, a local land-owner, had come forward to contest the seat in the anti-Bradlaugh interest. Words are faint and feeble to portray the asperity of that conflict. Rampant Conservatism on the one side was pitted against

furious Radicalism on the other. Personal hatreds, religious enthusiasm, the fury of sects, the jealousy of class, —every passion, good or bad, that excites the voter, was appealed to, and gave sting to a canvass which ended decisively in sending Bradlaugh back panoplied for a fresh bout with the Commons.

Northampton, the chosen battle-ground of Bradlaugh—who, however, does not live in the borough,—is a hot-bed of British Radicalism. It is a city of about fifty-three thousand inhabitants spread over a large area of rising ground sixty-seven miles northwest of London. It may be described more figuratively as the Lynn of England. Saint Crispin is its tutelary genius. It bristles with the smoking chimneys of shoe factories, and I have heard it estimated that at least half its population is engaged in leather industries alone. A large proportion of its area is covered with the lowly dwellings of factory-men. Women loaded down with shoes which they are taking home to finish by hand are met along every block, and a single factory gives work to more than a thousand hands. Of course, this city of shoemakers has been fertile ground for trades-unions, leagues, and all sorts of labor combinations; and a plentiful crop of "isms" has sprung up with them. The Bible brushes in constant warfare with socialism or Tom Paine, and the faithful and faithless of Northampton meet in perpetual encounter. The registered voters of the borough number 8,321, of whom all but a few hundred cast their ballots on that election-day.

These figures give a significant hint as to the inclusive character of the British qualification for the suffrage. In an English borough election every voter of legal age must have been a resident for at least a year, must have paid his taxes, and must either be owner or tenant of a separate dwelling, or the occupier of lodgings worth ten pounds sterling a year unfurnished. It will be seen that Northampton, though it is under these restrictions, turns out almost as many voters as an American city of the same size.

Entering the borough on the eve of the appeal to the polls it was easy to see that some momentous event was impending. Crowds lined the streets, and the open spaces of the city were filled with men earnest in gesture and prompt to back opinions by that supreme argument of Englishmen, a bet. Gangs of boys made the air resonant with yells, and frowzy women circulated among the crowd talking politics in a key as high as their own morals were low. The gin-shops were all doing a royal trade, and, in truth, the amount of drunkenness eclipsed any thing to be seen at an American election. The output of literature in the week's canvass was prodigious. Walls, sign-posts, and fences fairly bulged with calls to patriots of every stripe. Irishmen, Dissenters, Workingmen, "Christians of every denomination," and especially that focal object of the hand-bill, the "moderate man,"—who in that particular juncture figured as prominently as a chairman during a tie vote,—were all appealed to lustily

by placard. The bills were graduated from a simple "Bradlaugh" in letters five feet long down to a scrap of paper giving selections from those really outrageous utterances against religion and morals which have made of him a fair target. It was evident that the great majority of the literary effusions emanated from the anti-Bradlaugh camp. This, however, was to be attributed to the weak points in the record of the man, rather than to the suggestion made by a Conservative, that Bradlaugh's adherents could neither read nor write. The merit and temper of the poetry of that local crisis may be judged by the annexed extracts from two separate outbursts of the Northampton muses:

"Stand firm! my lads, against our common foe,
We 'll let them know, we 'll let them know!
Their great Iconoclast we 'll soon lay low:
From such we will be free.
Our virtuous wives and daughters he 'll insult no more,
Against our Church and Bible all in vain he 'll roar;
With Corbett at our head we 'll drive him from our door—
From such we will be free.

"CHORUS—'T is Edward Corbett shall our member be.
We 'll show the Rads we can be free;
And down with all their hateful company—
For Corbett shall our member be.

* * * * * * * * *

"O may the year that 's dawned on us with bright and sunny skies
See England from her ashes once more like a Phœnix rise!
At home be peace, and o'er the sea her prestige gained again,
And Gladstone and his Cabinet replaced by better men.

"CHORUS—Then wake, ye sons of Albion, from apathy awake!
No longer let such councils guide—such policy forsake;
Assert once more your ancient might, rout dastards from their den,
Throw off their trammels, show the world again you 're Englishmen."

Whatever may be thought of the Northampton poets, there is no doubt that the local politicians were up to the subtleties of their trade. A few days before, Mr. Morley, a benefactor of the London workingmen and a Liberal, had written a letter opposing Bradlaugh's reëlection. This was printed and placarded. Then the Bradlaugh men dug up an old letter of Morley favoring the election of Bradlaugh, and, leaving out the date, pasted it over the placard of their foes.

A call for a Bradlaugh meeting at the hall of the Northampton Corn Exchange, on the eve before the election, gave the writer an opportunity to witness an English mass-meeting. The hall, one hundred and fifty feet long by sixty feet wide, was jammed with a seething crowd of Bradlaugh men, all standing, for in the body of the house there are no seats. On a platform at one side, flanked by a body of well-dressed supporters, the candidate harangued the surging mass of human beings in front of him. Bradlaugh is a powerful speaker, and on that night, when he dealt in declamation and epithet, rather than argument, he appeared at his best. He is a stout man, some five feet eight inches high, with a moon face, relieved by a high and massive forehead. His voice, which

is his greatest gift, is clear, resonant, and penetrating; he delivers his words fluently, and his whole appearance and rhetoric constantly suggest Mr. Beecher. As to the popular element in the gathering, it was far more boisterous and demonstrative than our American mass-meetings. Every appeal of the orator for a show of hands brought up a vast upraising of soiled digits, followed by rousing cheers. The meeting, otherwise impressive, was marred by one discreditable episode. A well-dressed man who had held up his hand in opposition to the speaker was invited by Bradlaugh to come to the platform and be heard. Bradlaugh called for silence, which lasted only till the new-comer began his speech, which was drowned instantly amid a tempest of hoots and yells. After speaking a few words in dumb pantomime, the visitor took his seat, and then Bradlaugh had the effrontery to cite this case to the crowd as a praiseworthy bit of Radical toleration for free speech, and as a piece of liberality which his opponents never yet had conceded. It was, on the other hand, really a fair type of the treatment the Northampton Radicals give the Conservatives even at their own meetings. Not a single public Conservative gathering had been held that week but had been broken up by the rabble. If a Conservative, on the contrary, attended a meeting of Radicals and disclosed his political views, he was almost certain of rough treatment, and before he emerged his ordinary coat was pretty sure to be changed to one of the dress pattern bi-furcated at the top.

On election-day from early morning up to four o'clock in the afternoon, the voting was in progress at twenty-one polling places. The streets were thronged with partisans of both sides decked in the party colors—the Radicals wearing the so-called "Republican" cockade of mauve, green, and white, the Liberals red and white, the Conservatives orange and blue. It was noteworthy that during the day scarcely a Liberal cockade appeared, and that the rival tints were really Radical and Conservative. This display of vivid hues, which, besides ribbons and cockades, appears in the decoration of hats, in the banners on some of the houses, and in the hangings of the many carriages bringing the voters to the polls, lends a background of brilliancy to an English election in marked contrast with an American voting day. Order was guaranteed by four hundred soldiers from neighboring cities—some of them much the worse for a night's roystering—and a body of several hundred imported policemen and constables. But the crowd, as a rule, though boisterous, was good-tempered, and was immensely tickled by the spectacle of a prominent Radical and worker for Bradlaugh, who wore unconsciously all day on his back a Conservative cockade which an opponent had slyly pinned there. Considering the amount of drunkenness, the good behavior of the lower classes was remarkable, and could hardly have been equalled by an American rabble under like conditions.

The riotous balloting of the old Eatanswill order has

passed out of British politics forever. The nominations at the hustings, the speeches of the candidates to an accompaniment of rotten eggs, brickbats, and opposition brass bands, the balloting which could continue for days provided only a ballot was polled every legal hour, survive now only in the literature of the past. The nomination nowadays is a tame affair, only the candidate and three friends besides the legal officers being allowed to be present. The actual voting is even more prosaic. Each legal voter, after securing registration, is given a registration number. This, when he goes to vote, he tells to one of the poll-clerks, or if he forgets his number he gives his name, and his number is ascertained from the poll-books. Then he receives a ballot bearing, besides the names of the candidates, the voter's registered number, which is also entered on the stub from which the ballot is torn, like a bank check. The ballot is stamped on the back with a general mark to certify its genuineness, the voter steps aside to a screen, marks with a pencil or pen a cross opposite the name of his candidate, goes back to the box, shows the back of the ballot with the affixed stamp to the clerk, and drops the paper in the box. Through the good offices of an acquaintance I got admission to one of the Northampton polling halls. Nothing could be more commonplace than the rough set of board tables, the stout wooden ballot-box mounted in a chair, and the mechanical routine of voting. But it is well worth considering whether this English system, with its checks on fraud, has not feat-

ures worth adopting in our own country. While it necessarily discloses some votes to the polling officers who chance to know an elector's registered number, the obstacles to "split" tickets, the certainty of detecting any "stuffing" of boxes, and the heavy penalties attached to any betrayal of trust on the part of the poll officers, make the scheme well-nigh perfect as an electoral device.

At four o'clock in the afternoon the ballot-boxes were sealed up and taken under police escort to the City Hall, where the count began. As the time drew on for a declaration of the vote the excitement deepened. Among the Conservatives gathered at "The George" hotel the first reports, telling of several hundred majority for Corbett, created general good-humor and enthusiasm. Then came a dismal rumor of two hundred majority for Bradlaugh, and as this sank to the actual figures and was partly confirmed, cheerfulness gave way to universal gloom. It was curious to see how the mood, the sentiments, even the phrases of the people present reproduced what one hears in the camp of the defeated on an American election night. Fears about the prosperity of the community, threats never to cast another vote, charges of treachery and broken pledges, all attested that three thousand miles of blue water make small difference with human nature under political reverses. Meanwhile, outside, the cries of the victors began to be heard. Ten thousand men, women, and children gathered around the City Hall, waiting the official return. Finally appeared the Mayor with a sheet of paper

in his hand. A crier, resplendent in red and gold uniform, rang a bell, the vote was read with its majority of one hundred and eight for Bradlaugh, the crowd shouted, and the successful candidate offered his thanks and congratulations. He had indeed won a most signal and unlooked-for victory over a powerful combination of elements. The Irish vote of Northampton went against him bodily for his record on the Coercion Act; his rank atheism and loose social notions had alienated the Dissenters; moderate Liberals repudiated him as an annoyance to Mr. Gladstone; and the Conservatives polled their last man against him. He conquered by the sheer strength of his personal following of Radicals, slightly reinforced by a few ultra Liberals, by a small body of voters who believe he has been badly treated, and by the still smaller body of erratic men to be found in every community who are fond of political sensations and who will vote for any thing "just to see the fur fly."

ENGLAND'S GUN FOUNDRY.

A LITTLE city a few miles down the Thames from London holds in the military and naval affairs of England a position akin to that of the great London itself in the larger sphere of British trade. No foreign foe can threaten England's peace, no warlike plan be devised, no scheme of colonial defence be meditated, but that they are quickly betrayed in the huge gun factories and barracks of Woolwich. The city and its arsenal are a kind of martial thermometer, with a gun-mould for a tube, in which the rise and fall of molten metal registers the foreign policy of that empire whose drum-beat traditionally circles the world.

The Government gun-works in Woolwich, which give a national and even an international fame to the city, cover an area of about a hundred acres, fronting the Thames. In size, in amount of war material produced, and in the perfection of the plant, they are rivalled by no existing works of the kind except those of Herr Krupp, at Essen, in Germany. In time of peace the Woolwich gun factories give work to about five thousand men, who labor only for a few hours a day. But at the signal of war every department is fully manned, the number of workmen rises to fifteen or twenty thousand, all the machinery is set

in motion night and day, visitors are rigidly excluded, and the whole martial city bustles with new life and vigor. Even in peace, however, access to the works by visitors not British subjects is exceedingly difficult. The shilling or half-crown so potent elsewhere in England avails little at the Woolwich Arsenal. The American visitor who wants to see the factories has to make application to his Minister at London, who, in turn, must apply to a member of the British Cabinet, and tedious delays and endless snarls of red-tape obstruct the entry of a foreigner if he cannot, with the good fortune of the writer, secure the good-will of one of the managers of the works, and go in by the back door. British subjects can visit the works on a stated day each week, but many of the factories are closed to them, and the guide to whom they are entrusted seems chosen with a special view either to reticence or stupidity.

One of the first and most interesting of the structures seen by the visitor, on the left, immediately after entering the arsenal grounds, is the projectile house. Here are stored for exhibition specimens of most of the shot and shell used for field and naval ordnance. They include not merely the missiles now in use, but what may be called an historic series, beginning with the stone balls of mediæval times, and coming down to the perfected Palliser of the present day. The eye wanders amazed amid the medley of chain-shot, percussion shells, grape, canister, and single bullets of numberless shapes and sizes. The

monarch of them all is the conical Palliser shot used for the hundred-ton guns on the British iron-clads. The shot is about four and a half feet high, as it stands upright on its blunt base. It is twenty inches in diameter at the place where the conical slope begins, and it weighs nineteen hundred and twenty pounds. To make one of these huge missiles is alone a task of vast labor, using up days of work by hand in the various processes of shaping, polishing, and chilling the point. This method of chilling, now applied to all the large projectiles of the British Navy, is curious and instructive. The point of the cone is heated, then masses of cold iron are set against it. The effect of the contact, for some cause yet, I believe, unknown to science, is to extract the sulphur from the metal, leaving its fibre solid, hard, and tough. When fractured the chilled part of the big bullet shows a clear, bright, and firm rearrangement of the particles—a kind of recrystallization of them—in vivid contrast with the duller hue and rougher particles of the unchilled iron in the body of the missile. In the projectile house is preserved also every device in the shape of bullets or cannon-balls which has been suggested even to the most eccentric fancy of the British inventor. Among these whimsical missiles is one in the shape of a ball covered with spikes, and another is made by stringing grape-shot on a rope, the inventor asserting stoutly that his cord and bullets combined would cut in twain whole battalions and revolutionize warfare. His invention, like many others,

has been consigned to the limbo of mere curiosities. The many inventions for exploding the various shells with precision and at an exact instant of time scarcely attract notice. But on this point, at first sight so unimportant, the whole efficiency of the shell depends. On it there has been spent more of care and thought than on any other secondary branch of British gunnery, until now the explosion of the shell is timed down to the smallest fraction of a second after leaving the gun.

In a structure next to the Museum of Projectiles bullets are made, and some old-fashioned notions of bullet-making roughly dispelled by modern machinery. A large cylinder filled with two or three tons of molten lead is fitted with a plunger, reminding one of a huge perpendicular syringe. In the top are two semicircular pipes, through which the molten metal is forced, partly cooling on its way. The two half-circular strips of lead suddenly emerge at a point of junction of the pipes in contact with each other. Just here comes one of the most wonderful mechanical processes of the whole arsenal. Instead of keeping on as two separate pieces, the straight edges of the lead strips cohere firmly at the line of contact. It is explained, somewhat vaguely, that the pipes are made absolutely true, and that the particles of lead are brought to so close contact that they cohere under the same law which holds together the particles of any ordinary mass of cold metal. Whatever the cause, it is certain that the semicircular strips finally emerge in one solid round bar of gleaming lead.

The keenest eye cannot detect the central line where the strips were united, and the lead itself, under the hard pressure, is made more heavy and compact. Then an intricate machine, almost human in intelligence, seizes one end of the long coil, cuts it to small sections, and, quick as lightning, punches each piece into the shape of a bullet, round or conical, as may be needed. The bullets are inspected, counted, and packed away by the million for future wars.

But the manufacture of the great guns for naval warfare forms the really impressive feature of Woolwich Arsenal. Insular England, dependent on her navy, has, for the last twenty years, almost concentrated the mechanical talent of her Woolwich factories on this branch of her armament. How to make guns which shall perforate the iron-clads of other nations, how to make iron walls which the guns of other nations cannot perforate, is the twofold problem which constantly spurs her forward. A single sight inside the Woolwich Arsenal grounds shows how steadily the fight goes on between the iron-clad and the projectile. One sees hundreds of great guns in line side by side, made a few years ago, which have never been fired since they were tested, and are as new and fresh as when first turned out from the factory. Yet all these guns are to be broken up and recast into improved ordnance. Within a few years—almost months—they have become obsolete, and all the vast labor and expense they represent goes for nothing save the experience gained. To the

cost as well as the progress of wars these long lines of cannon, condemned without trial, bear mute but impressive testimony. For the most part they are recast into the heavier guns, weighing from forty to one hundred tons, which equip the modern Devastations and Inflexibles of England's navy.

Two thirds of all the structures of the Woolwich Arsenal appear to be given up to the manufacture of these colossal cannon. At the first stage of their construction there is made a long core of cast steel. Then strips of wrought steel as long and large as the beams of a house are wrapped around the breech end. The strips are laid on hot, one after another, in coils, and, contracting as they cool, form a breech of prodigious strength. Next the gun is placed on a lathe, turned smooth, the centre bored out and the inside polished until one can see his face reflected from its curves. The rifling is an operation needing peculiar delicacy and skill. It is done with a long stiff rod, upon the end of which is fixed a cutting tool of the hardest steel, grooving as it must the steel core of the gun. So slowly does the massive cylinder revolve that, even at the breech where it has largest diameter, it scarcely seems to move at all. The rifling rod as well as the rate of revolution is regulated by a beautiful piece of mechanism, covered with numbered arcs and figures, and described as a marvel of mathematical skill applied to a mechanical process. When the huge hundred-ton creature is done, it is a wonder indeed. Its weight is twice that of a large

railroad locomotive; it is forty feet long from breech to muzzle, and laid across Broadway it would reach just about from curb to curb; it is seven feet in diameter at the breech and two feet eight inches from inner bore to outer surface. With an efficient range of several miles, it carries a conical shot, twenty inches through, weighing almost a ton, and needing several hundred pounds of powder to project it. A shot of this size now penetrates the thickest naval armor plating, and cuts through twenty inches of solid iron backed with oak as cleanly as a bullet through cheese. It has, after much experiment, been found that the most effective rifling for these cannon is a groove starting as a straight line at the breech. Half way to the muzzle the groove begins to turn, and at the muzzle the curve is greatest, sending the ball out with a kind of circular "snap," which—so say the engineers—gives the greatest range and precision to the projectile.

The massive machinery, which handles these big pieces of ordnance as readily as a child's toy, excites scarcely more wonder by its strength than by its unerring accuracy. It includes a horizontal revolving bed, used for cutting the bed-plates for the guns, and probably not less than forty feet square; a crane which lifts easily two hundred tons, and can readily swing in air six American locomotives; and the famous trip-hammer, weighing forty tons, and said to be the largest in the world, yet which can be so gently adjusted as to force a watch-crystal into its place without breaking it. How excellent are both the material and

workmanship turned out by these splendid machines at Woolwich is proved by accident as well as by design. In a small building is shown an eighty-ton gun which was tested intentionally until it burst. By its side lies the big gun of the "Thunderer," iron-clad, which was burst by accidental double loading a few years ago, with the deadly result which many readers will recall. In both these great pieces the fractures are almost perfectly symmetrical, forming cubes forward of the breech, and proving alike how flawless was the material and how evenly distributed was the strength of the gun.

In the centre of the works rises a chimney some two hundred feet high, the tallest in the arsenal grounds, and said to be one of the loftiest in England. When this or any of the other chimneys are to be mended, the services of a bold chimney climber connected with the works are called for. With a kite he throws a string over the top, then pulls down the kite with a second cord after the first is properly adjusted. The string draws up a stronger string, then a rope, then a corded ladder by which the chimney is climbed. A few years since the man had thus scaled the top of the tallest chimney, built a wooden scaffolding for repairing it, and then come down for dinner, when the woodwork took fire from a flying spark; and it is related, as a specimen of the fellow's hardened recklessness, that after the fire burned out he ascended once again on the blackened and half-burned rope-ladder, not even waiting to have it tested. A long list of similar

incidents fill out the annals of Woolwich, to which could be added details of institutions at the arsenal which the limitations of this chapter must exclude—the torpedo factory, where secrets are so carefully guarded that not even a British general can get admitted, and the workmen are chosen specially for their high character and secretiveness; the great turf-covered magazines, where men, for fear of explosion, must wear list shoes and discard every thing metallic from their clothing; and the vast system of blast furnaces, placed underground, where the workmen who draw out the molten metal above must wear thick, wooden-soled shoes to protect their feet from the heated iron floor. Yet, when all the martial wonders of Woolwich, with their triumphs of gigantic mechanism, have been seen, the visitor leaves it with the feeling that, after all, the humblest factory in England stands for a larger idea in human progress than the great gun-shop, where science brings her supreme gifts only to aid man to kill his fellow.

LONDON IN A FOG.

THE visitor who sojourned in London during the months of February and March of 1882 had rare occasions to study that phenomenon so curious to the American eye, a London fog. The oldest residents of the city agreed that the winter then closing had been attended by the most dense and depressing mists that had ever visited the British metropolis. The affliction, moreover, had been deepened by two features of dismal portent; for several of the fogs had been attended by frightful railroad accidents, and the frequency and persistency of the mists during the whole winter went far to confirm the prevalent belief that they grow worse in London year by year. Slowly but steadily these noxious fogs of the great city are reaching the bad eminence of an epidemic disease; and though some optimists aver that their smoky vapors purify the slums, the theory stands for little against a recorded increase of the local death rate during fog time from twenty-two to more than thirty-five for each thousand of population. Londoners with weak throats and lungs nowadays, with all their local prejudice, concede the fatal quality of their mists; they migrate by thousands every winter to the gentler climes of Pau, Nice, or Italy; and business men afflicted merely

with hard colds break away, when they can, from the thrall of trade, to Paris, or the sunnier regions of rural England. How these terrible fogs shall be avoided, how mitigated, how endured, are questions as staple in London common talk as the doings of Parliament, the Irish Question, or the newest sensation in society or at the theatres.

The London fog has been given many a picturesque place in modern British literature; but not even the graphic prose of Dickens has paid it more vivid tribute than the swift verses of Henry Luttrel:

"First at the dawn of lingering day,
It rises with an ashen gray;
Then deepening with a sordid stain
Of yellow, like a lion's mane,
Vapor importunate and dense,
It wars at once with every sense.
The ears escape not; all around
Returns a dull, unwonted sound.
Loath to stand still, afraid to stir,
The chilled and puzzled passenger,
Oft blundering from the pavement, fails
To feel his way along the rails;
Or, at the crossings, in the roll
Of every carriage dreads the pole.
Scarce an eclipse with pall so dun
Blots from the face of heaven the sun.
But soon a thicker, darker cloak
Wrapping the town, behold, in smoke,
Which steam-compelling trade disgorges
From all her furnaces and forges
In pitchy clouds too dense to rise,
Descends rejected from the skies;
Till struggling day, extinguished quite,
At noon gives place to candle-light.

Oh, Chemistry, attractive maid,
Descend in pity to our aid ;
Come with thy all-pervading gases,
Thy crucibles, retorts, and glasses,
Thy fearful energies and wonders,
Thy dazzling lights and mimic thunders ;
Let Carbon in thy train be seen,
Dark Azote and fair Oxygen,
And Wollaston and Davy guide
The car that bears them at thy side ;
If any power can, anyhow,
Abate these nuisances 't is thou ;
And see, to aid thee in the blow,
The bill of Michael Angelo.
Oh ! join (success a thing of course is)
Thy heavenly to his mortal forces ;
Make all the chimneys chew the cud,
Like hungry cows, as chimneys should,
And, since 't is only smoke we draw
Within our lungs at common law,
Into their thirsty tubes be sent
Fresh air, by Act of Parliament."

Science has at last come to certain fixed conclusions as to the nature and origin of these Cimmerian mists. As is well known, bituminous coal is burned almost universally in London grates. More than a million chimneys pour from their sooty throats the unconsumed elements which we call smoke. It hangs around the house-tops, lurks through the streets, begrimes the out-door and in-door work of immortal artist or architect, and makes the clearest of London days only a shade brighter than our Indian summers at home. He is a fortunate sight-seer who from the top of St. Paul's has ever, even on a sunny day of June, scanned a horizon more than a mile away. This

all-pervading smoke rather than the watery atom is, as science avers, the source of the terrible London fogs. The mist left to itself would dissipate in the sun or be forced away by the winds. But the smoke charged with an oily ingredient derived from the bitumen of the coal has a peculiar affinity for the moisture. It surrounds each tiny spheroid of water with a film of oil, and, as we may say, greases the skin of the mist, making it proof against the ordinary action of the air, wind, or sun. The result is a strange compound of soot, oil, and mist combined in minute particles, hanging heavily in the atmosphere, and while it lasts making the life of the Londoner a burden and a sorrow. Incidental causes add to the intensity of the phenomenon. Sometimes a change of wind drives back the slow-drifting fog in an accumulated mass. Reaching the narrow and sinuous streets of the city it sinks by its own weight and gorges the thoroughfares, spite of the breezes which, in places more open, would bear it away.

To study by night a London fog in its deepest pitch one must during its prevalence visit the neighborhood of the parks of the city where large bodies of water add their exhalation to the ordinary mist. Half a mile from Regent's or Hyde Park it may be that the fog is comparatively thin. The eye can perhaps penetrate it for fifty feet, and one can descry moving objects and avoid them. But the moment one steps into the denser fog area the ghastly change begins. The foot-passenger first

notices that, as he moves on, objects seem to fade without new ones coming into view. Then the city lamps, though perhaps only a hundred feet apart, die out one by one. There is no real black darkness, but, if I may use the paradox, a darkness of impenetrable light, a darkness made visible. One seems to be immersed in a luminous cloud so solid that it can be handled, cut, and shaped. The fog seems also to deaden all sounds. A human figure —man, woman, or boy—suddenly materializes on the pavement a few feet away. It glides by noiselessly like a phantom, and is gone. You feel like a human apparition among fellow-ghosts. Every thing puts on the same unearthly aspect. The gas-jets become little spurts of blue flame hanging in the air and barely perceptible thirty feet away. The solid pavement is felt below the feet, but is unseen. The hand held close to the face is descried, but, moved to arm's length, the digits become spectral, then dissolve. The stillness of the streets, the general hush of sounds of traffic, and a peculiar sense of isolation and helplessness keep up the illusion that one has for the moment passed from the world of mortals into a region of disembodied spirits.

Apart from its supernatural aspect a dense London fog brings out some queer phases of human life. The street boys hold high revel during the mists. Buying for small sums long pieces of hemp, stiffened with tar, they light the ends, and a party of them earn a good stock of sixpences by escorting lost wayfarers home. At the sta-

tions of the underground railroads, and at centres of cab traffic, gather dense crowds unable to get their bearings and utterly helpless without aid. The cabmen, who in ordinary times know all the ins and outs of London streets, are as helpless as the rest. If they take passengers at all, it is for short trips and big prices, and even then they venture only at a walk, leading their horses by the bridles. On the occasion of one of these fogs I remember almost tumbling over a prostrate horse which had fallen across the foot-pavement on which his careless master had led him. As a rule, passengers caught in the deeper mists leave cabs and omnibuses, preferring foot travel as equally fast and as a safer style of locomotion. The absolute helplessness of almost everybody, the blind leading the blind, the lost seeking their bearings from the lost, and the universal confusion and chaos fill in the details of a curious picture out-of-doors. In-doors there are scenes well-nigh as grotesque. The smoky mist has a singular penetrating quality, and only needs a keyhole to get in. At the hazy theatres the actors all counterfeit in appearance the ghost in Hamlet; at large in-door places, like the reading-room of the British Museum, half the interior is entirely obscured, and, even in the smaller rooms of dwellings, objects appear dim and phantom-like. The fog is usually accompanied by a chill in the air that cuts to the marrow, and the smoke breathed in by sleepers is thrown off from the lungs in the morning as a black secretion of phlegm. Another

quality of the London smoke-fog is disclosed by the singular fact that the electric light makes less impression on it than a gas-flame of the same candle-power.

During a London fog some months ago, which several residents said was the densest they had ever known, the writer was at some pains to test the thickness of the mist on Baker Street, a thoroughfare, from curb to curb, about as wide as Broadway, and opening on Regent's Park. From the middle of the roadway the bright lights of the shop windows were quite imperceptible. Standing under a gas-lamp one could barely see a foot passenger fifteen feet away or a passing cab in the middle of the street. At ten feet distant the gas-jet became completely isolated from its surroundings. The lamp with the supporting iron post disappeared, and the flame, changed to a sulphurous blue tongue of vapor, was projected in the air and hung in space. Once outside the light of the street lamps the range of vision became much more circumscribed. Large vehicles passed ten feet away unseen and scarcely heard. Passers-by could be discerned at a distance of perhaps six feet, and then only the upper parts of their bodies could be made out, the legs and feet being hidden by a still denser stratum of fog which seemed to wrap the pavement. All distinction of color was gone, and even opposite a street lamp dark buildings, as well as those of light hue, took on the universal dull tint of the smoky mist.

This is the London fog in the night-time. By day

it presents phenomena less weird, but more varied and curious. Sometimes, indeed very often, it becomes what is known locally as the "yellow fog." Dame Nature, for the time being, seems to have an acute attack of jaundice. The atmosphere, owing to some occult combination of sunlight and mist, changes to deep yellow. The tawny and depressing color suffuses all objects, just as if a thick yellow glass had been thrown across the face of the sun to produce on this earthly stage the solemn effects of certain tints on the boards of a theatre. Anon, perhaps, this yellow changes to a soft pink as the stratum of fog grows thin. The sun now reappears in the likeness of a stage moon, and its disk is as clearly defined as though seen through smoked glass. This pink fog throws out a peculiarly pleasing color, not unlike the glow of sunset, making the dull streets long vistas of rosy haze. The "high fog" of London is even more remarkable. The mist forms a thick, dark stratum with its lower surface—so say the men of science—about one hundred and fifty feet above the streets. Below the air is free from mist, but a darkness like that of dusk prevails. At noon during one of these high fogs, when standing in the open air, it is just possible to read the clear type of the London "Times." Sometimes, on the contrary, the mist hangs low in a dense but thin stratum. From the top of a high building, or from the elevated parts of London, the sun is seen undimmed in the clear blue sky. But the lower parts of the city

are plunged in a dense sea of fog whence the chimney-pots, steeples, and rough tops of buildings project like wrecks from an ocean. Now and then a moving fog of this kind can be seen sweeping like a river six feet deep down the streets adjacent to the parks, while all above is blue ether and bright sunshine. The inconveniences of the worst fogs by night are repeated by day. Traffic is often stopped, the street and shop lights blaze at noon-tide, and out-door life is tedious and dismal to the last degree. Thieves and pickpockets have a rare chance to get in their work at these times, and a few months ago, during one of the fogs, a bold rascal smashed a jeweller's show window with a stone and escaped easily with rich booty.

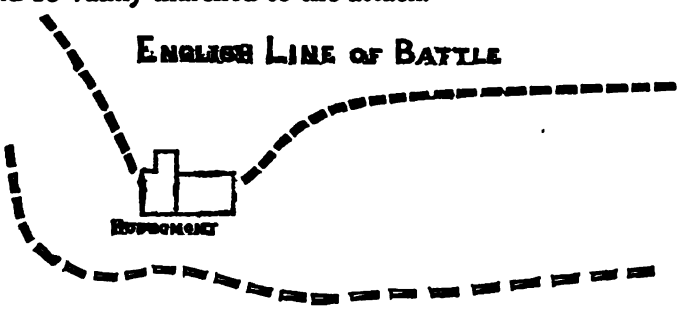
With the increased and increasing prevalence of the mists have come, of course, plenty of schemes for doing away with the noxious smoke which is conceded to be the chief cause of the evil. Prescriptions for building fires without vapor are as common in London as panaceas for sea-sickness. But Smoke Abatement Exhibitions, the skill of inventors, and the suggestions of science have all thus far ended where they have begun—in fog; and misty winters of disease and discontent remain as a dismal certainty of the future. Looking forward to the distant period when London's population, chimneys, and smoke-fogs shall be multiplied, the prophetic eye may see a germ of reality in the well-worn figure of Macaulay's barbarian looking down on a desolated city.

WATERLOO TO-DAY.

ABOUT twelve miles south of Brussels the traveller from London to the Rhine passes by rail through the little Belgian village of Braine l'Alleud. It is a mere clump of lowly but neat dwellings, whence each morning come forth troops of wooden-shoed Belgian women to till the adjacent fields. On three sides of the village, north, south, and west, are gently rolling fields which stretch away far as one can see with the eye. But on the east the graceful curves of land rise to bolder proportions, and three miles distant they swell into two ridges with a long sweeping dip between. From crest to crest the ridges are, perhaps, three quarters of a mile apart, with a direction nearly north and south, and a length of three or four miles. But the westerly ridge at the southern end makes a sudden turn and bends backward in a blunt angle toward the village of Braine l'Alleud. Upon these twin ridges and the intermediate space was fought the battle of Waterloo: the angular ridge marked the British position; the straighter ridge was Napoleon's line of battle; and at the apex of the angle, just within the converging British lines, is the farm-house of Hougomont.

A homely outline may sometimes give a clearer idea of a battle than the most elaborate map with prolix and

confusing explanations. In the appended diagram the reader can see the battle of Waterloo reduced to its simplest terms. The lines of battle of the rival armies, as depicted, corresponded closely with the two ridges; and between the lines lay the long, gently curving hollow, across which the columns of Napoleon so persistently and so vainly marched to the attack.



French Line of Battle

This is no place or time to rehearse the details of a fight over which the military critics have battled almost as fiercely as did the combatants themselves on that fatal Sunday in June, sixty-eight years ago. But I may venture to say that two prominent features of the battle must impress even the most cursory visitor to the field. The first is the general simplicity of the plan of the contest, which, without tedious narrative, may be described as the attempt of an army posted on one long ridge to oust their adversaries posted on another. The second and more significant point is the immense strategic value of Hougomont in the fight. The bunch of buildings bearing that name are in some accounts of the battle called a château,

in others a farm-house. They are in reality neither, but something between the two. They consist of a solid, plain structure of brick and stone, shaped like an elongated New England barn; a smaller but similar building set at right angles to the longer one; a little brick chapel placed in a triangular court, and once used for devotions by the owners; and a connected orchard, planted thickly with pear- and cherry-trees. The structures, with their court-yard and orchard, cover perhaps the area of one of our down-town city blocks in New York. The strategic strength of the position is largely due to the solid outer walls of the buildings, the massive gates leading to the court, and most of all to the brick wall, a foot thick and six feet high, which, starting from the outer corner of the smaller building, runs around the orchard on two sides. On the day of the great battle the open rear of the orchard was covered by the British cannon posted on the rising ground farther back; the buildings were pierced thickly with loop-holes and filled with British veterans from the Spanish Peninsula, hardy warriors, whose backs the best of Napoleon's marshals never saw; and a line of British soldiers rested on a long platform set half way up the orchard wall, and fired over it at the enemy, while another line, lying beneath, shot through loop-holes. Hougomont thus was changed in one night from a peaceful dwelling into a fortress, all the more powerful because the most far-seeing foe could not forecast its strength. A thick wood, now cut away, stood between it

and Napoleon's cannon; and, indeed, the inferior artillery of those days could, in better position, hardly have made any quick impression on its walls. It projected like the prow of an iron clad from the point of the British angle, and for hours the surges of battle beat against it in vain. In later years Wellington called Hougomont the key of the fight, and it seems strange that the historic victory should have received its name from a little village, miles away from the field, where the Iron Duke sent off his first despatches, rather than from the stronghold that saved the day.

The Hougomont of the present time has relapsed into one of the dullest of Belgian farm-houses. A few staid fowls pick a scant living in the court-yard, three or four gaunt cows are stabled in the smaller of the structures, and a squalid dairy-woman talks in broken English to the visitor, or proffers him for five cents a glass of fresh milk. But the buildings and walls, though mouldy and weather-beaten with time, are still well preserved. The outer walls, pock-marked with French bullets, the British loop-holes in the brickwork around the orchard, and the chapel with its interior burned out by the French shells, remain just as they were. There is shown, too, an old well which, tradition says, was filled up with dead bodies after the fight, and in the blackened chapel devout visitors are moved to awe by a large wooden crucifix whose scorched feet the flames just touched and then died away. The famous orchard, though filled with the buried dead

below, bears no outward trace of the conflict, unless it is the grave of a British soldier of rank, who, dying in England, was at his own wish brought back to be laid under the soil on which he and his comrades had fought so bravely.

Following northward the rectangular ridge on which the British were posted, and travelling along its longer arm away from Hougomont, one sees in succession the places on which were enacted the most dramatic scenes of the battle. First comes a little embankment, so low that the guide must point it out before it is noticed. It is perhaps three hundred feet long and a foot and a half high, evidently the remains of the ridge of dirt thrown out from some old sunken road. Just before this ridge, and almost in the centre of the British line, the fortunes of the day were decided. Across the dip of land in front, and up the rising slope, Napoleon, descrying the approaching Prussians, sent his Imperial Guard. The little embankment was low, but it sufficed to hide the rows of the British Guards lying behind in the wheat, whose sudden rise, fatal volley, and quick charge closed the fight. A few steps in front and one comes to the spot where the Old Guard was annihilated, and where Cambronne, according to the popular legend, bequeathed to posterity his immortal phrase, "The Guard dies, but never surrenders." The upper end of this humble embankment marks also the spot where Wellington viewed his final stroke of victory, and closed a military career that was unbroken by defeat.

Still farther up the ridge, and precisely in the centre of the British position, stands the most ambitious token of the battle. It is a conical mound, turfed over, and rising perhaps a hundred and fifty feet from the crest of the ridge below. Hundreds of Belgian workmen were employed for months in raising it, at a cost of almost two hundred thousand dollars. On its summit is reared a stone pedestal, surmounted by a colossal bronze lion, which, fronting the east defiantly, seems to symbolize the courage with which the British lion faced the foe on the opposite ridge. The lower part of the stone base, shattered and black, records the attempt which some Gallic vandals made, a few years ago, to blow up the memorial with gunpowder. Wellington persistently opposed the rearing of the mound, because the removal of the earth used for it partly changed the crest of the ridge and obscured some of the landmarks of the fray. But from the tourist's point of view the mound is an immense advantage. From its top every point in the long battle-field is clearly outlined. The height shortens the distance to Hougomont, and brings it and the other places of interest almost to one's feet. The long twin ridges, and the slope between, change as by magic into a level checker-board of grain fields, on which women and men toil in the sun. As is the case with land all over Belgium, the area of Waterloo is cultivated almost to the last square inch. In the budding spring season, the young wheat, rye, and barley are green, but a little later in the year they are

mottled by red patches of poppy—a fresh suggestion of the battle. Sentiment, standing on this height and feeding on heroic thoughts, finds her wings sadly clipped by the reflection that these Waterloo acres are worth eight hundred dollars each, and will lease, every one of them, for thirty dollars a year.

Stretching northward from the monument, the ridge sinks almost to a plateau, while the dip in front, between the positions of the two armies, rises. It was on this plateau that the brunt of the battle was borne by the squares of British infantry. The heavy cavalry of Napoleon swept, time and again, across the plain, passing between the human craters belching their volleys of musketry. The remnant of sunken road a little behind the level area is pointed out as the place where some hundreds of French cuirassiers, charging beyond the squares, were precipitated, and lost their lives. So far as the battle-field shows, this is the only germ for that colossal fiction of Victor Hugo—the story of the loss of a large part of the French army in a chasm. Just in front of the plateau, and half way between the two ridges, is the farmhouse of La Haye Sainté. During the fight it was battled for fiercely, and, standing midway between the main lines of the two armies, it was taken and retaken many times. Now it is a pacific little structure of brick, partly walled in, and a model of rustic neatness. It faces a road running east and west, which divided the left centre from the left wing of the British forces. On the north side of

the road, and along the British left wing, the fighting was bloody, desperate, and undecisive. But the only spots of present interest are a long slope where Ponsonby's cavalry made their famous charge against the French cannon; and a slightly depressed basin, in which some of Napoleon's heavy guns stuck fast in the mud and were disabled. The farm-house of La Belle Alliance, farther along the road to the eastward, where Napoleon fixed his headquarters, where Blucher and Wellington met, and where Napoleon's travelling carriage was captured; the distant monument toward the northeast marking the field where the vanguard of the Prussian army was first engaged; the memorial to the dead of the German legion,—all these, though deserving of the traveller's visit, merit no detail here.

Military critics, including Wellington himself, have described Waterloo as an unscientific battle, and a poor one to illustrate the art of war by. The fight is authoritatively called an attempt of Napoleon to crush the British by main force before Blucher came up, and to do it on a field where deep mud and the simple contour of the two parallel ridges opposed either quick or complex strategy. All this may be true, yet the famous field will always be visited, and always deserve to be. The genius of the two rival commanders who first met there, the fateful result of the contest to Europe, and, above all, the dramatic and familiar incidents of the fight, will never cease to attract the tourist. In visiting the field he should, if possible,

traverse it on foot; he should secure a good English-speaking guide, under an iron-clad bargain; and before taking a step on the field he should put to rout the "Old Guard" of dirty youngsters who otherwise will dog him all day to sell their "relics" from the Belgian junk-shops. It is one of the most humorous sights of Waterloo to see an Englishman trying to pump up heroic memories in the midst of one of these swarms of human gnats plying him with spurious bullets and old bones. But at Waterloo, as at every other historic spot in Europe, the meanest swindles of the present jostle the great deeds of the past.

THE GIANT TIDES OF FUNDY.

EVERY school-boy has read in his geography a few words about those tides of marvellous sweep and rise which have made the Bay of Fundy world-famous. The body of water where these tides occur is of a singularly curious and fantastic shape. It will be pretty nearly represented by the back of the human hand if the thumb and all but the middle and forefingers be folded, and the two latter extended in the shape of a prong. The back of the hand proper will then depict roughly the main body of water in the bay, while the two fingers will show the two upper bays or estuaries where the tide rises highest. If the bottom of one of the fingers were to be tightly constricted by a cord, we should have a crude counterpart of the narrow entrance of one of the upper bays and a still closer general likeness. From the broad sea-mouth of the Bay of Fundy to each of its two heads is about one hundred and fifty miles; at its broadest point it is some fifty miles wide; and the whole body of water has a little more than twice the area of Long Island Sound.

Without affecting scientific exactness we may briefly speak of the familiar tidal rise and fall which we see on the sea-shore as due to the attractive force or gravity exerted on the fluent water by the moon and the sun—the

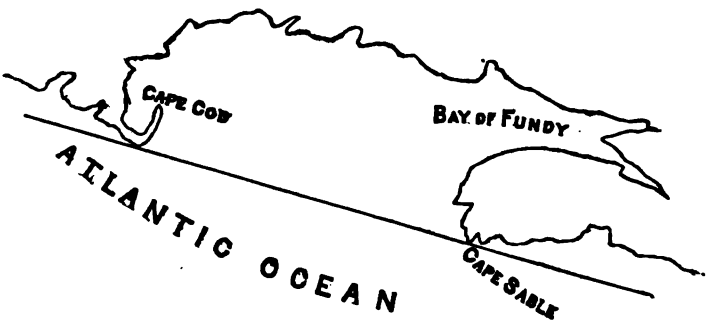
former, owing to its nearness to the earth, exerting about twice the tidal energy of the greater luminary. But the height of the tides at various times differs, from a number of causes, such as the relative positions of the sun and moon, the union or division of their attractive powers, the shapes of the bodies of water attracted, and so on. Some strange phenomena are produced by these variations. A tidal wave, which in deep water may travel one thousand miles an hour, may have its velocity reduced by shallows to fifteen or twenty miles, and its direction reversed. So, too, just as superimposed waves of sound are made in the experiments of Professor Tyndall either to strengthen the sound or to destroy it entirely, two tidal waves may make higher tides or neutralize each other, preventing any tide at all, as happens at certain places on the Pacific coast. For like reasons, in some regions there is but one tide a day, in others four, while headlands, bays, and sounds modify the rise so decidedly that the immense upheavals of water in the Bay of Fundy are attended with a rise of only eighteen feet at its mouth.

By way of more direct illustration of the cause of the Fundy tides, let us suppose a boat to be rocked gently at the mouth of a shallow ditch, wide at its outlet, but converging somewhat sharply to a point. The little wave, at first perhaps almost imperceptible, will quickly increase in height until it rushes in a narrowing but higher breaker to the ditch's end. This essentially explains the huge tidal waves of the Bay of Fundy. The

estuary is simply an extensive ditch in which a prodigious volume of water rushing from the Atlantic pours along the converging shores, steadily swelling upward. One or two other remoter influences may, however, affect the tides of the bay. A straight line drawn from Cape Sable on the eastern side of the bay to the hook of Cape Cod cuts off a great ocean bay some two hundred and fifty miles long coastwise and one hundred deep, with the Bay of Fundy at its upper extremity. The regular tidal current of the Atlantic is deflected northward from Cape Cod, so that the Bay of Fundy, with its two converging prongs, acts as a kind of tidal funnel to a much larger funnel, and the immense mass of Atlantic water must heap up until its equilibrium is reached. The two remoter funnels, or prongs, as we have described them, called the Bay of Chignecto and the Basin of Minas, of course receive relatively an even larger proportion of the flood. They are the last of a triple series of sea-funnels, at whose upper ends the steadily converging tidal waves attain their greatest height. The crude diagram on the next page may serve to show the exceptional configuration of coast-line that produces these wonderful tidal convergences.

At Windsor, on the River Avon, and a dozen miles from its mouth, is one of the most eligible places to observe the grander phenomena of the Fundy tides. The Avon at that point is a wide estuary varying from a quarter of a mile to a mile in width, fronted on one side

by the dikes of the farmers, on the other by the Windsor wharves. Stand on one of the piers and see the flood at its highest. It is a bay of wide expanse, and deep



enough to float an ocean steam-ship. A strong wind beats the surface almost into ocean breakers, and the dark-red waters dash angrily over the piers and against the opposing dikes. Two long bridges span the ruddy stream, which swells roughly to the planks and seems as though it would dash the structure away. Through smaller streams the flood penetrates far inland, and looking northward the whole country seems afloat, as during a Western freshet. The water opposite Windsor at full of the moon, when its attraction unites with that of the sun, rises some thirty-five feet from the river bottom.

This, then, is the spectacle at high-water. Go now and see the estuary when the tide is out. The river is no longer a river at all. A great chasm, half a mile wide, and so long that its extremities are invisible, yawns at one's feet. In the centre is a little rivulet a few feet broad, which a

child could wade. At the edge of the gulf is a precipice of red mud. Then comes a steep slope; then another precipice, slanting finally to the stony bottom of the channel. The vast gulch appears as though suddenly opened by an earthquake, and its rents and reaches of dark-red soil give a secondary semblance to a half-cooled Inferno. There is, too, a droll and incongruous side to the spectacle. Every thing of human build is so absurdly disproportionate to the meagre streamlet that it seems as though man had lost his reason and was making ludicrously toilsome preparation against a remote and impalpable foe. The two long bridges are spiders on stilts, with no water below. The dikes, reared with so much labor, are far inland, and have no wave to resist. Ships at the wharves rest on the edge of a muddy cliff, and are seemingly as remote from navigation as the Ark on Ararat.

Presently, as the tide turns and the rise of the water begins, there comes a magical change. The sluggish drift of the small rivulet is stilled. A moment later its current turns backward from the sea, swelling in a few minutes to a creek twenty yards wide. Turn away and look again after a quarter of an hour. The creek has grown to a navigable river—restless, turbulent, foam-streaked, and half as broad as the East River at Fulton Ferry. Now for the next hour is the time to watch the rise of the waters in all their strength and fury. The current, gaining velocity every instant, rises into huge undulating waves. Surges of water, half an acre in extent at places,

swell from below and seem to impose themselves on each other. At the boiling edges of the stream is a stone or log; a moment later and it is gone from view. The waters burst through the piers of the bridges as if at the mouth of a flume, and streaks of foam, hundreds of yards long, trending down-stream, mark where the currents have intersected. The whole effect is that of a compound of Niagara rapids with a Maelstrom, only here is dark blood in place of water. Once, on a sandy slope of the Avon, I tested the rate of rise. On an incline of sand which might be called steep I placed a mark two feet from the edge of the flood. The water reached it in forty seconds by the watch. Up a slope of two-hundred-feet face these gigantic tides of the Bay of Fundy will climb at the average rate of more than a foot a minute, and sometimes much more rapidly. A curious phenomenon attends this in-coming tide at Windsor. During the second hour of its flood it seemingly rises far higher and faster than during all the rest of the period of its upward flow, intensifying vastly the grandeur and impressiveness of the spectacle.

One of the most interesting effects of the first approach of the tide to its lower level appears when it reaches the crest of a long sand-bank with a large basin behind it. The waters creep up steadily until a little rill begins to pour over in a miniature rapid. Almost before one can say it the rill has grown to a rapid brook, and in a few moments more to a swift dashing river, spreading rapidly

at its lower end until the wide basin is covered. Erelong, too, the whole sand-spit is under water, only signalling its presence by breakers on the surface of the now deepening flood. On some of these more level spaces, but still with a perceptible slope, I have seen the waters climb twenty-five feet in sixty seconds.

By far the most sublime of the tidal spectacles of Fundy is the sudden rise of the waters in a bore or tidal breaker. At Monckton, New Brunswick, twenty-five miles from the Bay of Chignecto, and on a river with name as big as its tides, the writer had once an opportunity to see the bore by bright moonlight. On the wharves, at half-past nine in the evening, had gathered a large crowd, drawn thither partly by the coming bore, partly by the seductive rays of the full moon. The tide in the river—at Monckton a stream about a quarter of a mile wide—was still running out sluggishly, more than thirty feet below the level of the wharf. All at once far down-stream came a distant rumbling like the sound of a railroad train. A few minutes, and a dark line crossed the river in the distance. The line gradually materialized in the moonlight until it became a foamy wall three feet high, swept up the naked flats, and, in a wild reach of white billows preceded by a breaker, passed us up-stream. The waters behind the advancing crest rose six feet instantly, and where before had been a lazy downward current was a raging sweep of muddy water rushing up-stream. At many places, particularly on the flats below

Truro, Nova Scotia, on the Basin of Minas, the bore is much grander than at Monckton. Sometimes it is eight feet high, and travels fifteen miles an hour. Large fish—cod, shad, and even the strong salmon—are occasionally dashed up by it lifeless on the shores. It has been known to drown cattle, to wreck a large, laden schooner, and to toss a craft as heavy as a pilot boat high on the banks, upside down. Hogs rooting for food on the sand-slopes have an instinctive inkling of its far-distant coming, and run grunting to high land. Not uncommonly the bore is followed up by flocks of sea-birds, seeking small fish, and one bold species of the curlew variety has been seen caught in the boiling comb, then rising from behind the breaker, to seek again its prey in front.

Scientific light on the origin of the bore, or "eigre," as it is more technically called, is rather dim. Maury and Ansted describe bores without explanation. Herschel and Somerville explain them, the one as the rush of a swift tide against a river current, the other as the resultant of a tide rising rapidly at a spot where the restraining friction of the bottom is excessive. Perhaps we can at once harmonize and illustrate both explanations by imagining a pail of water dashed suddenly on a smooth floor and the little breaker created in front of the tiny tide by friction on the floor as analogous to the bore which sweeps over the upper flats of Fundy. Bores, however, are rare tidal curiosities, apparently only possible where the fiercest tides meet peculiar conformations of coast.

More famous than those of Fundy are the bores in the Chinese river, Tsientang, the East Indian river, Hoogly, and the Amazon, some of which attain a height of thirty feet and a speed of twenty-five miles an hour. The speed of the Monckton bore was about that of a fast runner. At times the bores of the Bay of Fundy are followed quickly by second and third tidal breakers of lesser height.

The figures subjoined, copied from an English tide-table, give the average height in feet of the Fundy tides at three places, compared with three of the highest of the North Atlantic tides on European shores. The figures for Sackville and Parrsborough are, however, much exaggerated.

	Spring Tide.	Neap Tide.
Sackville	50	24
Quaco	32	18
Parrsborough	45¼	25
St. Germain (France)	42	16
Thames River (England)	19¼	14¼
Bristol (England)	44	22

It ought perhaps to be explained further that when the sun and moon pull together—that is to say, when the moon is full or new—the highest or spring tides are produced; and that the neap or low tides occur when the moon is in quadrature and pulls at right angles, or nearly so, to the line of the sun's attraction. As a general truth, it is safe to say that the real height of the Fundy tides is much overrated. The phenomena are so vast and im-

pressive that human nature finds exaggeration even easier than usual. Probably a forty-feet tide either in the Basin of Minas or the Bay of Chignecto is very uncommon; one of fifty feet very rare indeed. The latter may, however, occasionally happen when the spring tides are naturally highest, and when united with them is an excess of water driven into the Bay of Fundy by a protracted and strong south wind. The figures for the range of tides, I presume, refer to the rise from the bottom at the place where the measurements are taken. If allowance is made for the ascent of bottom, from the mouth of the Bay of Fundy to its heads, higher figures would be reached. It will readily be seen that the varying elements of the problem, and particularly the uncommon coincidence of extreme spring tides with a southerly storm, make authentic data as to the very highest Fundy tides all but impossible to obtain. Local opinion is utterly untrustworthy. There is hot rivalry between half-a-dozen towns on the upper waters of the bay to prove title to the "highest tides in the world." One example will show the deceptiveness of local assertion: At Monckton everybody, talking of high tides, refers back to what is called the "Saxby tide" of a dozen years ago. Commander Saxby, of the British Navy, an authority on tidal movements, predicted for a certain date a great rise of water in the Bay of Fundy. Fortunately for his prophecy, there was a terrible southern gale on the day named, and the tide swelled to most devastating proportions. At a wharf in Monckton, which descends straight

to the low waters, I have measured carefully the distance with string, plummet, and yard-stick, then added the altitude to the Saxby high-tide mark, as recorded on an adjacent building. By this test the whole rise from low-water to the top of the Saxby tide was forty-two feet and eight inches. Yet every good Moncktonite, with one hand on the Bible and the other on his heart, will assert his conviction that his tides often rise at least sixty feet.

Still, with all allowance for local error, the titanic Fundy tides remain terribly grand and impressive sights. Many queer incidents attend their rise and fall. It is related that years ago a stranger vessel struck solidly on a rock in the bay during a high night tide. Next morning, to the bewilderment of the crew, they found their craft overhanging a precipice. The immense flats left bare by the receding waters favor the fishermen, who, using very deep nets of the seine or gill sort, can shut off many acres of water; and when the nets are left high and dry during the spring fisheries, near St. John, New Brunswick, fish are seen hanging high in air. Boys then climb the meshes as a ladder to bring down the cod or salmon from their airy perch. By no means the least of low-tide curiosities are the beds of the creeks cut by the currents through the lowlands at the upper waters of the bay. These tidal creeks are not, as with us, a steep bank of three or four feet, then a loose sand bottom, but deep gashes cut down to an acute angle at the bottom twenty feet below. The

creeks are usually about as deep as they are wide, and it seems as if some giant surgeon had slashed triangular sections from the blood-red soil, leaving the wounded earth bleeding and ghastly. All these lowlands, extending over hundreds of thousands of acres, are diked in many directions against the flood; but once in a few years the muddy streams are let in to refresh the soil with their deposit. The diked lands fetch, some of them, two hundred dollars an acre, and the density and height of the hay crops raised on them almost pass belief.

At St. John, a handsome city fronting a fair harbor at the mouth of a river of the same name, the Fundy tides make their first contact with intense civilization, and manifest themselves in singularly curious and interesting spectacles. The waters rise and fall through a range of some thirty feet—at full of tide, lifting the long lines of ships until their taffrails rise far above the wharves; then dropping the hulks on a dry, hard bottom, so deep below that the sailors must climb down to their craft by ladders. The slips run dry, and where before were thirty feet of turbid tide the drays drive out loading and unloading by the bulwarks of the stranded ships. More amazing is the phenomenon in the harbor itself. The great tides at flood pour up the St. John River through a gorge forming a mighty stretch of roaring rapids, spanned by a suspension-bridge a hundred feet aloft. Twenty miles up-stream the fresh and salt fluids mix in a brackish current, which at ebb tide pours back through the chasm in

a foam-flecked bedlam of waters. The traveller, at first wondering at the vastness and speed of the swift flood, scarcely believes his own vision when a few hours later he sees the roaring tide tumbling between the beetling cliffs in an opposite direction. It is as if one, on occasion, should discover the rapids above Niagara rushing back with inverted current toward Lake Erie. Churned into great masses of foam which, as steam-boat engineers will tell us, brackish waters when agitated readily generate, the river pours into the harbor. There the floating nebulæ of foam cohere until they form beds of whiteness so like cakes of ice that the harbor in mid-summer puts on a wintry guise, and the stranger must rub his eyes to dispel the unseasonable illusion.

Just below Parrsborough on the western shore of the Basin of Minas, the Fundy tides reach some of their lowest levels, and disclose one of the finest sights on the coast. The slope is stony, covered with small pebbles of slate, and the tide leaves a symmetrical curve descending like the quadrant of a great amphitheatre. Though the slope is so steep that it is difficult to climb, it takes a muscular and trained arm to throw a stone three quarters of the way down from high- to low-water mark. The slope, measured in paces, showed on one occasion about three hundred feet of distance, and afterward the waters receded half as far again. The wharf, built in two stories, looms up like the side of a tall building, yet a high spring tide sweeps its summit. Half way down the

wharf, standing in the mud, the steamer Hiawatha, of more than two hundred tons burthen, can reach with the summit of her smoke-stack only the topmost mark left by the tide on the wharf. Around the point, a few miles from Parrsborough Wharf, the tide passes by Cape Split, through a channel a few miles wide, to fill up the great Basin of Minas. In the channel off the cape the current boils by at the rate of eleven miles an hour. The strongest vessel can scarcely make headway there in a gale against the rush of water, and the seamen say no craft can hold anchorage in the channel for a moment when the swift tide is running.

Along the Basin of Minas is Acadia, the land of Evangeline, immortalized by the plaintive hexameters of Longfellow. Poetry is one thing, realism another. The modern Anglo-Acadians quote Nova Scotia history to prove that their evicted French predecessors were stalwart rogues of vindictive temper, who aided the Indians in their cruel warfare against the English; and they aver stoutly that any Briton whom the strong tide left stranded among the poetry-haloed Basils, Gabriels, and Evangelines was reasonably sure to get his throat cut.

NEWFOUNDLAND AND THE COD-FISHERS.

THE traveller to Newfoundland from New York will have at least one illusion rudely dispelled before he reaches the island. We in the United States constantly think of Newfoundland as a country close to Canada and readily accessible. Geographically the idea is correct. The island, one of the largest on the globe, does, indeed, project to within sixty miles of Cape Breton, which is substantially the eastern point of Nova Scotia. But the Newfoundland we voyage to is another land. It is reached by way of the seaport of St. John's, and is eleven hundred miles and five days' journey from New York. The fast ocean steamer, on her way to Liverpool, must consume three or four days to reach the island's southern shore at Cape Race. Then comes a country so isolated, so abundant in insular peculiarities, and, withal, so unknown to the outer world, that Greenland or Ethiopia can scarcely be called more remote.

If a strong-armed ball-player were to take a rotten apple and with all his force hurl it against a wall, the result would be a crude but graphic likeness of the map of Newfoundland. The ragged outline of the island, its rough coast line, its infinite succession of deep bays, jutting headlands, and wild ravines of water, would be

depicted with a generalized but realistic fidelity. Two long bays at one point almost cut in twain this island, with its area of a little less than New York State. Northward other bays, cutting sharply the land, expand into inland seas. Northward still a peninsula runs up almost to Labrador, like the arm of a huge frying-pan. To say that the coast, almost two thousand miles long, is rocky, describes it tamely. It is not rocky merely, but one great rock, now shooting up into peaks, now breaking into wild fissures, but always precipitous, bold, bare, and inaccessible. Against the fierce wall of cliff four hundred feet high, running sheer into the ocean, the wild waves of the Atlantic break, the storm winds whistle, and the dreary fogs drift in dark encircling folds. Back of this dismal coast come mountains one thousand feet high, covered with cold, low firs, scant bushes, or absolutely bare. The interior of the island is almost an undescribed region. Tracts of land with ten thousand square miles are marked on the maps "unknown" or "unexplored." If one were to go ashore almost anywhere along the centre of that southern coast which is often distantly seen from the decks of the ocean steamers, he would, by a walk of ten miles inland reach a region where the white man has never set his foot; and this in a country peopled by Great Britain three hundred years ago, and the oldest of her North American colonies.

In picturesqueness of site no city on our continent equals St. John's, the capital and chief seaport of the country,

with a population of some thirty thousaud. Sailing up the savage eastern coast, the steam-ship suddenly turns shoreward. It seems for a while as if the vessel was about to dash herself against the solid fringe of rock. But all at once there comes in sight a little crack in the rocky wall. Behind the cleft is a group of houses, perched on a hill which is almost a precipice. The vessel takes her pilot, and is steered for half a mile through the crack. The cliffs loom up for several hundred feet on either side, and it seems as though one could cast a stone between their beetling faces. A single short chain and a few heavy guns would bar the entrance against the navies of the world. Within, a sudden turn presently brings to view a placid haven, a mile long and half as wide. It is girded with the warehouses or factories of the fishing firms, by busy wharves and shipping. On the west the city slopes to the top of the hill, while on the eastern cliff the fishermen have built their platforms for drying the cod. These platforms, technically called "flakes," give a most curious effect. They are stages set on poles stuck in every fissure and projection where the rock gives lodgment. The stages, or, as we may call them, the roofs of the flakes, are thatched with brushwood, on which the fish are laid in the sun. In one place these "flakes" rise in five great tiers, slanting backward in terraces like the pictures of the hanging gardens of Babylon. At spots one can walk for an eighth of a mile under these roofs of codfish, shutting out the sun and filling the air with odors too pungent for

verbal description. A single sniff of St. John's air near the flakes is the equivalent of a whole lenten season of codfish diet.

St. John's is one of the few cities of the world which have no local taxes. If her codfish smell, her local administration does not. Even her schools are supported by a grant of the Newfoundland Government, which has no public debt and raises all its revenue from customs, the tariff averaging about fourteen per centum *ad valorem*. The isolation of the city may be inferred from the fact that it receives its mails from England and the United States but once a fortnight. The coming of the Allan Line steamer is an event that crowds the wharf and makes the city bustle with excitement. The climate of St. John's and of Newfoundland has the singular quality of improving wines, whole cargoes of which are shipped to the city to be kept a few years and reshipped to Europe.

The people of Newfoundland may be separated into three divisions—the well-to-do residents of St. John's, the fishing class, and the French, who live on the far northwest coast. Many of the people of St. John's have wealth, accumulated from the seal and cod trade. They are cultivated people, of good manners, and hospitable to a point almost onerous to the recipient of their kindly courtesies. Their leading social amusement is card-playing, in which the seductive draw-poker takes the lead of other games. Even the best ladies play poker, with stakes adapted to the feminine standard. The prevailing

type of nationality is English or Irish, modified by insular surroundings. Three quarters, at least, of the population of 180,000 in the whole island is made up of the poor fishermen. They are a hardy, rough race, familiar with every phase of ocean life, ignorant, narrow, and insular, but kindly disposed. Some of their linguistic oddities, at the remoter fishing stations particularly, are worth noting. Like the Southern negro, who so often uses "him" for "it," so these islanders twist the word "he" into absurd combinations. "Will the trout be cooked soon?" was asked the waiter girl at one of the coast inns. "Maybe he will be," was the reply. "The wagon has lost he's wheel," or "I don't know where the spade he is," illustrate further these peculiarities. The name of the island is almost universally pronounced New-fun-land, with strong accent on the final syllable. The marine habitude of the people crops out in the term "skipper," always employed by a subordinate in addressing a superior, or by a street boy accosting a gentleman. Northward is in Newfoundland "down" in direction, the phrase "down north" corresponding pretty closely to the "down east" of our Middle and Western States. For the Newfoundlander's phrase "up south," we have no equivalent, excepting the "up to South End," of Boston. There is also a strange broadening of vowels in colloquial speech. Thus ridge becomes in Newfoundlandese "rudge," and fire "fur." Many of them would say, "The forest has been 'furred,'" —*i. e.*, burned over. The wives of the lower order of

islanders, who stay at home, till the soil, and do all the manual labor of the household, while their lords are at sea, become a brawny set of Amazons, terrible in domestic warfare, and ruling their consorts in most imperative fashion. A party of thirty railroad surveyors who recently entered a little hamlet were put to flight by a few of these muscular dames and forced to appeal to the police before they could continue their work. The lower classes, particularly the Irish, are intensely ignorant and superstitious. Not long ago, in one of the smaller towns, certain shrewd spirits wanted to change the local cemetery for a better burial-place, the old one being occasionally overflowed by the waters of Conception Bay. They carried their point easily by asserting that on winter nights they had seen the ghosts troop out to dance on the ice of the bay and protest against their moist treatment.

The man who thinks that Newfoundland dogs of noble mien and build troop in droves through the country is, in our Yankee phrase, a good deal "off." The Newfoundland dog is not only, like the traditional prophet, without honor in his own country, but there are very few of him at all. The pure breed is almost extinct. We find any day in a New England town better dogs of the Newfoundland type than I have seen during a week's stay in the city of St. John's. The streets are filled with mongrels, big dogs, small dogs, spaniels, esquimaux, and mastiffs, but almost all low curs of vile breed and pattern. Well-informed Newfoundland-

ers smile satirically when you extol their famous dogs, and go so far as to deny that the animal originated in the island at all. As a rule, the big black Newfoundland dog is a much-abused beast. He is sought out more for strength than for beauty, kept on low diet, used in winter to draw heavy sledges of wood, and is made any thing but a household divinity. His temper is good up to five years old, when he is apt to become snappish. The water is his natural home, and he will steal away at night and travel long distances for his bath. The tests of his purity of breed and general merits are a thick-webbed foot, large bushy tail, the comely shape and poise of the head, and deep black color on the roof of the mouth. His degeneration is charged to the abuse of him as a beast of burden, and to one of the island's old laws to protect sheep, which has allowed policemen a fee of fifty cents each for shooting dogs found at large—a statute under which many fine dogs have been ruthlessly slaughtered.

The earliest records of the island show that the aboriginal dog of the country was a good-tempered creature of great size, and so strong that he could draw from the water seals weighing hundreds of pounds. He had a passionate fondness for the sea, lived on raw fish, and was a skilful fisher, swimming rapidly under water and catching his prey in his mouth. A case is cited where one of these dogs was seen catching fish for sheer sport, heaping them up on shore and then plunging in for others. The same records prove, however, that this dog was of an ex-

tinct species very different from the present Newfoundland animal, though the latter, in this latitude, is very fond of raw fish.

Next to its dogs, Newfoundland's fame rests on its fogs. The Arctic current, driving southward and along the coast, meets the Gulf Stream and condenses the warmer vapors, just as a glass of ice-water gathers drops. The mists comparatively seldom penetrate inland, but in one direction or another they hang around the island with a weird darkness like that of smoke, and closing in—a "sea turn" the islanders call it—make navigation on the cruel coast as dangerous as on any waters of the globe. Hundreds of stout ships have steered to wreck in the mists on the rock-ribbed shores, and a winter journey to St. John's is more perilous than a trip to Europe, the Allan steam-ships sometimes using eleven days for the five hundred and forty miles from Halifax to St. John's. A spot traditional for disaster is "Mistaken Point," a little west of Cape Race, so called because of the difficulty of distinguishing it in the fog from the cape itself. Here, within a few days of each other, the steam-ships Washington and Cromwell, in 1877, ran ashore and were lost, with some seventy lives, not a man escaping. From the heights above the fishermen saw corpses and wreckage churning against the lower cliffs, but only two bodies were secured by an adventurous seaman, who went down the face of the rocks by a rope. Internally and as a whole—except, perhaps, in one tract yet to be penetrated by the railroad—Newfoundland is

an unpromising region—a land of continuous rock, here and there covered with boggy wastes, and with vast areas where old fires, killing the low firs, have left wastes of dead trees that tire the eye with their monotony and expanse. The summers are brief and moderately warm, the springs marked by a marvellously sudden burst of vegetation, the winters about as cold as those of New England, and attended by deep snow-falls. Along some of the roads are seen long lines of stakes as tall as small telegraph poles, placed at short intervals, to mark out the winter path. The Vermont toll-house keeper who, after the big snow-fall, put out the notice, "Toll taken at the second-story window; after the next storm please drop the change down the chimney," would have found a rare field for his drollery on these semi-Arctic winter roads. Newfoundland has lakes without number, some of them sixty miles long, and teeming with trout. She has wildernesses where game are abundant; she raises fine vegetables, and she produces, as late as August, fine crops of strawberries. But as yet she yields to commerce little except copper ore, seals, and codfish. Her people, as a rule, are so backward as almost to be archaic, and in St. John's the watchmen from ten o'clock to daylight call the hours. Excluding the wealthier classes, and decidedly including the alleged hotels of St. John's, the country still lacks essentially those prime elements of civilization, a clean bed and square meal.

If the natives of Newfoundland are ever perverted

to heathenism, their chief god will surely be the codfish. Already the cod almost touches divinity, or at least is the emblem of all things material. The Newfoundlanders recognize the dignity of their fish-god by stamping him on their local currency, and but for the manifest inconvenience would no doubt make him legal-tender for payment of debts. So ubiquitous is the fish, and so familiar does he become, that when one passes a fifty-cent piece at St. John's he half expects to find a ten-pound codfish among the small change. On official documents, on postage stamps, on bank-notes, the cod and his familiar dewlap meet the eye. Spread on platforms, and broiling in the sun, he forms a fishy fringe around the island—a wall of defence, if not against invading armies, at least against the fiercer foes, poverty and starvation. The allegorical importance of the codfish is sustained by the facts and figures. The islanders catch probably not less than $7,000,000 worth a year, and more than half their annual exports of $8,000,000 are made up of their staple fishy commodity. Every part of the cod is useful: the head fried is an esculent dainty—a kind of compound of sweetbread and calves'-foot jelly; the tongue cut out and nicely browned in the frying-pan is an improved imitation of the fried oyster; the skin is used for fine glue, the sounds are eaten or made into the isinglass of the cook-book, the Norwegians grind up the bones for cattle-feed, and the French buy the spawn for baiting their sardine fishing grounds.

Stretching for hundreds of miles southward and southeastward of the island, and sixty miles from shore at the nearest edge, is the Grand Bank of Newfoundland, that mystic table-land of the sea, whose limits and nature are still undefined. A little way oceanward from its slopes the sea reaches some of its greatest depths, and within its boundaries are depressions where the fisherman's anchor never touches bottom. Old cod-fishers say that the Grand Bank is steadily rising, and that a few centuries will find it jutting above the surface. The Grand Bank, with its adjuncts, is some six hundred miles long and from two to three hundred miles wide. The shallows over it vary from ninety to four hundred feet in depth. The Grand Bank is, beyond comparison, the finest fishing ground in the world. For centuries the fishermen have visited it, and millions on millions of tons of codfish have been taken there, but still the yield is undiminished. Sometimes for two or three years the fish will be scarce, and the report will spread that the bank is "fished out," when suddenly a year of unprecedented catches will dissipate the theory. For about six months in the year, beginning with May, the codfish swarm, not only over the Grand Bank, but, in lesser size and numbers, along the whole North American shore from the latitude of New York to an unknown distance northward. They are found from the eastern waters of Long Island to the farthest extremes of Labrador, and even up to the regions of eternal ice. What lures the cod from the

ocean depths to which he goes in winter is not certainly known, but it is surmised that he either follows up the small shore fish or seeks the sea cherry—a small red berry that often grows on the weedy bottoms where the cod is found. It is also pretty well established that during the summer visit shoreward the female fish spawns. The immense race of cod, far outnumbering all the other large fish of the sea, is accounted for by its fecundity. Nine millions of eggs have been computed in the roe of a large specimen, and all the codfish caught by man are a mere cipher compared with the billions, large and small, swallowed by sharks and other fish of prey.

One of the greatest curiosities among the inhabitants of the deep is the squid, in Newfoundland the orthodox bait for killing the codfish. The squid is a smaller species of the huge devil-fish, or octopus, wonderful specimens of which have of late years been found on the Newfoundland coast. The squid, take him concretely, is a revolting-looking creature. Cut a section, say ten inches long, from a common eel, transform its flesh into a tough jelly, give it a cruciform tail at one end and eight short sucker-armed feelers at the other; conceive the suckers, each armed with a circle of small teeth, and the feelers converging to a cruel hawk-like beak—then we shall have a weak likeness of the squid. The creature's mode of progression is original. It has within its body an elastic suction-tube holding almost a pint of water. Filling the tube by drawing water through holes

in its mantle, the squid, by a sudden squirt, drives itself backward as fast as a fish can swim, and by inverting its tube can move with equal velocity in the opposite direction. Jigging for these squids is a rare spectacle. The "jigger" is a red stick of wood circled with sharp but barbless hooks. The hook is let down, the squid, which enters the Newfoundland bays by myriads for food, is attracted by the red color, clasps its arms over the hooks, and is drawn up to its death. But as it reaches the surface the novice must be on guard, for the squid shoots straight at its captor his charge of water, followed by another squirt of an inky fluid, which on light garments is almost indelible. The fishermen know the creature's trick, and by a skilful movement induce the squid to deliver his charges upon one side, then by a quick inversion of the hook drop the squid in the boat. A squid-fishing fleet of boats, closely grouped, so as to keep the schools of lively octopi collected, is an animated sight. Each man tends three or four lines, and has all he can do when squid are around. The bustle of the fishers, the thumping of the squid in the boats, and the incessant squirts of water to a height of several feet in all directions through the fleet, make up a most picturesque sea spectacle. The flesh of the squid has some poisonous quality that makes even the tough skins of the fishermen sore by long handling. On the codfish hook its flesh grows white and tough, making very alluring bait.

Closely allied to the squid as cod bait is the caplin. The caplin is a small fish, of the salmon species, about the size of the smelt, and very like it in appearance. It never varies more than two or three days in the time of its coming to the Newfoundland shores, where, late in June, it suddenly throngs all the bays in prodigious numbers. A single boy with a small dip-net can catch several tons a day, and a few men can readily secure a schooner load. The waves dash the caplin on the shores in great numbers, and the residents often cart them away for manure. Although a delicious fish, much like the trout in flavor, the caplin is rarely eaten. Indeed, for a fishing people, the Newfoundlanders are amazingly backward in the use of their food fish. Few of them even know how to cook the cod so as to be eatable; they rarely eat the trout with which their inland waters are filled; and though they raise the best potatoes in the world, they seem profoundly ignorant of that delicious product of Yankee-land, the codfish-ball. After the caplin go away, in July, the squid come in, and after them the herring, so that Providence has provided a triple series of cod baits, without any one of which a third of the season would be lost.

His bait once assured, the fisherman begins his toilsome season on the fishing grounds, seeking the Grand Bank, heretofore referred to, the inshore fisheries, or the coast of Labrador. The fish off Labrador, or on the Grand Bank, are always largest and most valuable, but the fisherman there must incur vexatious delays in securing fresh

bait or in going shoreward to dry his product. His is an arduous and perilous calling. The cod usually bite best at sunset or sunrise, and often tug at the lines all night. So by darkness and day the fisher is at his post, save when a storm forces him to heave-to on the Banks, or, nearer shore, drives him to port. The rasping line, drawn up often from a depth of two hundred feet, cuts his fingers; the poisonous squid and salt used in canning the fish wear the skin to the blood; hunger, exposure, danger, are all his lot. Moreover, in Newfoundland, he fishes for a hard master, the wholesale dealer, who furnishes the equipment, taking as security a chattel mortgage, thus bringing the poor, ignorant fisherman in debt at the opening of the season. It is reckoned a fair season's catch if the fisherman comes out with profits of one hundred and twenty dollars, on which he must weather through with wife and children the piercing winter months. During his absence the wife tills the ground, rears the children, and even cures the fish which her lord brings home. On his return from the remoter banks, often after an absence of five months, the fisherman relapses into sulky idleness for the rest of the year. He sits by the fireside with his pipe, leaving his wife to do the household work, and becoming by comparison with his decidedly better half a most inconsequential and good-for-nothing creature. He may be captain on the water, but his wife is full commander on shore, and the subjection to which these imperious fish-wives reduce their

nominal lords and masters is a funny side of social phenomena in the queer island.

The cod is any thing but a gamesome fish. A few initial struggles way down in the depths, and he comes up with a dead pull, like a log. Unless very large and hungry, he bites daintily; and out of ten that bite probably but one is hooked.

In "trawling," the fisherman sinks a long rope fitted with short snoods and hooks. The rope is ingeniously buoyed to logs, to which is attached a staff and flag in such a way that each wave throws the flag in air and signals its spot. Two men in a boat, often several times a day, "underrun" the trawl—the man in front drawing up and taking off the fish, while his companion baits. The "seine," so called locally, is a net of great length and depth, so arranged as to "purse" at the bottom by a drawn cord, and secure the fish in the same manner that menhaden are caught on our coasts. The local title of "trap" is applied to a contrivance much like our fish-pounds, but made entirely of nets. The seine and trap are both used effectively when the cod is gorged with caplin or squid and refuses to bite.

To cure a codfish well requires care and experience, and unless done well all the fisher's toil may go for little. The cod is usually passed to a gang of four men. One rips up the fish, a second takes out the entrails and cuts off the head, a third—usually the best man of the gang—by a deft movement cuts out the backbone, a fourth

spreads on the salt and lays the fish in a pile. Then the heaps of cod are distributed on the flakes, or fir-strewn platforms, reared along the shores. Everywhere in the neighborhood of the unnumbered fishing villages these broad platforms appear, now perched in a cleft of the rocks, now rising in tiers, but always placed near the sea, in which the offal is dropped. During the curing, which lasts two or three weeks, the fish must be watched carefully. If left too long on one side, they become "oversalted." The sun in that case draws the salt to one side, leaving the other soft or rank, and the fish is almost unsalable. Then they must be heaped up at night, covered with canvas or oil-cloth against rain, and tended almost as sedulously as babes. When ready for market they are sold to the wholesale dealers, bringing at St. John's, during a scarce season, only five cents a pound. Newfoundland finds her chief market in Roman Catholic countries, where the fish are consumed during Lent. Lately, however, the Norwegians have become hot rivals of the Newfoundlanders in the European markets. American housewives may be glad to know that the local tests of a good salt codfish are a surface hard and well dried on both sides, white flesh, and an absence of salty crystallizations. Efforts, thus far, to utilize as compost the thousands of tons of offal annually wasted have failed, and the same is substantially true of attempts to preserve the delicate caplin in some permanent edible form.

Taken as a whole, the life of the poor fisherman of

Newfoundland is far from enviable. Half-starved at home, cheated by the merchant, sunk in squalor, filth, and misery, he drifts easily into dull routine and a kind of mental stupor. He somehow—partly, it would seem, by his very lack of aspiration—preserves his good temper; he becomes a marvellous seaman, and he can dress fish with the precision and speed of a machine. But his whole horizon, like his island, is bounded by a circle of cod, and even Paradise, to his vision, resolves itself into an Eden whose seas teem with codfish, and whose markets the Yankee and Norwegian never can invade.

SEAL-HUNTING ON THE ICE-FIELDS.

AMONG the many strange industries of the world that exact from men hardihood, persistence, and daring, scarcely one compares with the pursuit of the oil seal, a calling substantially monopolized by the Newfoundlanders. The seal here referred to must, at the outset, be distinguished from the fur seal of Alaska, whose soft coat makes warm the heart of the city belle in exact proportion as the face of paterfamilias grows blue and his pocket-book thin. The creature sought by the Newfoundlander yields only oil and a coarse-grained but expensive leather; he comes down on the ice from the far Arctic every spring, and soon after the breeding period, which begins about the middle of March, the fierce hunt for him opens, lasting until about the end of April. How important this industry is to Newfoundland may be conceived of from the fact that about six thousand men engage in it each season at St. John's alone, while the annual exports of seal products reach a value of more than $1,000,000. Next to the omnipresent codfish, the seal is the commercial staple of Newfoundland, and deprived of the animal the islanders would be forced to bridge a terrible gap of semi-starvation and poverty.

The life of the seal, or "swoil," as the Newfoundland-

ers call him, is a most curious career of variety and change. Little can be said of the mysteries of his winter life, which is passed far up on the edges of the lower Arctic zone of ice, which, breaking away in early spring, floats southward on the Labrador sea-current. Their gregarious habit then brings the seals together in immense numbers, and old sealers tell of having seen dozens of acres of ice so thickly covered that the creatures could scarcely move. As the ice drifts into melting latitudes the troops of seals disperse. Where they go is uncertain, except that a few scattered wanderers swim southward along the coast of the United States as far as the Delaware River. The majority, no doubt, return to the Arctic ice-fringes, where, though warm-blooded creatures, they find their most congenial home. The food of the full-grown seal is another of the mysteries of its existence. In the shallows it is fish, but the seal is often found fat and rotund on the Atlantic ice, sailing for long distances over depths where small fish either never live at all or live a mile or two below the surface. The breeding period begins about the middle of March, after the ice has floated to a point some six hundred miles north of St. John's, the female seal bringing forth her single young on the hummocks. Then occurs a most extraordinary freak of growth. The young at birth weigh about five pounds. In fifteen days they weigh forty or fifty, gaining sometimes as much as five pounds in twenty-four hours. Nature furnishes the "white-coat," as the baby seal is called, an oily coating of blub-

ber just beneath the skin, which in ten days thickens from half an inch to three inches, or even four. The young seal during this period of astonishing development lives on its mother's milk and on animalculæ which it sucks from the pores of the thin drift-ice. The seal fishermen have half-a-dozen names for the seals at various stages of growth. They are, "white-coats," "harps" (from a dark harp-shaped mark upon the back), "bedlamers," "hoods," and "doghoods," according to age. The doghood is the old male seal, which is equipped with a thick skin on the head and neck. When attacked, the doghood resists fiercely, and the hardest blow makes no impression on the tough integument which the animal draws up in folds so as to completely cover the forehead and nose.

The sailing of the seal fleet from St. John's early in March is the momentous event of the year. All through the long winter, shut in by deep snows, living in utter idleness and depressed by chill poverty, the fisherman has eked out an existence most miserable and monotonous. With March and the sealing season his fetters are broken, and there comes an abrupt transition. *Omnis longo solvit se Teucria luctu.* The fishermen, hardy, muscular fellows, inured to the sea, crowd the streets. The great sealing firms are fitting out their craft; there is a hum of life on the wharves; business everywhere in the town awakes, and the whole city feels new life and impulse. On the first of March the sailing vessels leave for the northward "to meet the ice," as the local phrase goes. They are

allowed twelve days' start of the sealing steamers, which go on the 12th of March every year. These steamers are staunch craft, some of them so large as to be of eight hundred tons register. Their bows are iron-plated against the thick ice which they must often encounter to reach the breeding-grounds of the seal. They are crowded with sealers, not unfrequently carrying as many as two hundred and fifty men, "sardined" three in a bunk scarcely the same number of feet wide. Altogether some twenty of these steam-vessels, with three thousand hands, leave the harbor almost simultaneously. The wharves are crowded, flags flutter in the breeze, and saluting cannon roar their sonorous farewells. But, lively as is the day of departure in these times, it is tame compared to the going of the sailing ships thirty years ago, before steamers had well nigh monopolized the trade. In those days there sailed each year almost four hundred vessels, manned by thirteen thousand men, and old residents of St. John's dilate with pride when they picture the magnificent sight on the day when the great fleet put to sea.

Now the four or five days' voyage to meet the southward-moving ice begins. Keen watchmen on the masts keep watch for the first sign of a seal herd. The superstitious sealers greet as a happy omen the finding of a solitary baby "white-coat" on a strip of ice. Some of them kill the creature, and, like the ancient augurs, examine the entrails, professing to know occult signs showing the direction in which the seal herd must be sought.

Others say that the direction of the baby seal's nose when first seen proves where the herd is, and still others take on board the baby and keep it alive "for luck." Erelong, if good fortune follows the craft, the seals are sighted. The steamer runs into the broad ice-fields, the deck covered with excited men waiting the signal to disembark. The ice, perhaps, is covered for half a square mile with the young seals, fifteen days old, incapable of taking to the water, and watched by father and mother seals, who never desert their young in extremity. Another moment, and two hundred frenzied men, armed with long staves, are over the sides, and the slaughter opens. A scene follows which even hardened sealers describe as piteous. A blow on the nose stuns the young seal. Then, drawing a sharp knife, the sealer, with wonderful celerity, rips open the skin and blubber, pulls out the gory carcass, and leaves both on the ice to take another victim. The seals have a cry almost exactly like a human being, and tears like those of mortals fall from their eyes. Their wild wailings, the piteous attempts of the mothers to shield their young, the bloody ice, the quivering carcasses crawling often some distance before life is extinct, and the shouts of the butchers, make a sight that beggars all description. The massacre done, the "pelts," as the hides with the attached blubber are technically called, are put on board the steamer, which, if not loaded, begins search for a new herd and fresh butchery. Only the young seals are killed on this first voyage, as their pelts are proportionately more

valuable, and the old seals can be left for a second venture later in the season.

These sealing voyages are either immense successes or most costly failures. Tens of thousands of dollars are needed to equip the vessels, which sometimes return without a solitary pelt. But the profits of one good voyage compensate for several bad ones. The pelts fetch in some years as much as four dollars each, and instances are recorded where more than forty thousand have been brought in by a single steamer. One of the largest catches on record is that of the steamer Resolute, which, some years ago, after a short voyage, returned with forty-two thousand pelts, worth one hundred and twenty-five thousand dollars. Seal pelts had to be loaded into the berths, even the boats were filled, and the vessel steamed but three and a half knots an hour during her return to St. John's. In the city excitement runs high during the absence of the steamers. Bets are made on their takes, the respective merits of their captains are canvassed, every arrival is noted with eager interest, and trembling owners await the news that heralds great profits or a heavy loss for the year. At best the business is a huge "gamble," needing large capital and persistent struggle. One firm, for instance, which a few years ago made a hundred and seventy-five thousand dollars in one season, has, in the year of this writing, lost eighty thousand dollars. The captains of the craft are paid a royalty of ten cents a seal. Of the cargo, after the roy-

alty is deducted, one third goes to the crew and two thirds to the ship-owners, who find vessel, supplies, and equipment.

A motley and curious lot are the men who for a few weeks in the year hunt the seal. Stalwart in frame, used to the sea until they have absolute contempt of its terrors, bold in adventures on the treacherous ice-floes, and marvellously skilled in seal lore, they make up a body of men in some respects not to be matched on the globe. Crowded like pigs on a sealing steamer, they cultivate a positive affection for dirt, and regard it as a kind of honorable badge of their adventurous calling. During a voyage of several weeks they never take off their clothes, even to sleep. The oil from seal blubber fairly drips from their garments, dirt, soot, and tar adhere to their faces in steadily thickening strata, and when they finally enter port to strut the streets in unwashed glory they are incarnate emblems of filth and odor. A night in St. John's after the arrival of two or three lucky seal crews means bedlam for the city. Honest burghers fly the streets and look well to the doors and shutters o' nights. On the ice the endurance, surefootedness, and daring of the seal-hunters are well-nigh incredible. They leap from cake to cake where it seems even a child could not be sustained, drag their heavy boats long distances through the hummocks, and think nothing of passing a night on the ice far from the steamer, provided only seal are near. Their cold hands they warm by thrusting them in gashes cut in

the still palpitating carcass of the seal, and one instance is recorded where a freezing sealer saved his life by heaping up the gory carcasses for a night over his own body. When hunting, the sealers go by twos so that one can aid his companion should he fall in the water between the floes. Though the finding of the seal herds is largely a matter of luck, considerable depends on the sagacity of the captain, who, if up to his business, watches carefully all the winds of late February and early March so as to know where and when the ice can best be met.

Curious and isolated facts gathered from sealing experiences are retailed without number. Some years ago, during an otherwise bad season, the seals "struck in" on the ice near the Newfoundland coast while the steamers were away. Women and children, leaving the shore, engaged in the slaughter, and during a few days sixty-four thousand head were killed within a few miles of St. John's. At about the same time a cyclops among seals was found with only a single perfectly-developed eye exactly in the centre of the forehead. In another case a large shapely animal had eight flippers instead of four, the usual number. The flippers of the novel creature, all of full size, were arranged symmetrically by fours on the upper and lower parts of the body. Whether these specimens were freaks of nature or represented separate species, is a question for zoölogists. The flippers of the seal, by the way, when fried are reckoned a rare dainty by the islanders, and are often brought back from the ice in long

strings to be kept for food. When, as rarely happens, more seals are found than a single steamer can load, the surplus are killed and the pelts heaped on the ice, to be marked with the steamer's flag. In that case an unloaded vessel can bring in the pelts and demand a certain large percentage of their value. On their second voyage out the steamers seek the full-grown animals, which weigh some two hundred pounds. They are fierce fellows, who force their way to the water and have to be shot, making the process of collecting pelts slow and unprofitable as compared with the capture of a new-born herd.

When the steamers arrive the pelts are unloaded and transferred to the oil factories which line the eastern border of St. John's harbor. The blubber is separated from the pelt to be tried into oil, which is used for lubricating, for fine soaps, and a dozen other purposes. The skins are salted, then sent to Europe, where they are tanned into coarse but handsome leather, particularly beautiful for its graining, and worked up for purses, costly book-binding, and like uses. As stated, the sealing business of the North Atlantic is almost monopolized by the Newfoundlanders. A fleet of steamers, belonging to a firm at Dundee, Scotland, sails every year to the ice-fields, but they take their crews at St. John's, and there also is the factory of the owners. The monopoly is now, and promises to be for all time, a natural one, founded solidly on proximity to the ice and still firmer on the long traditions, the trained experience, and the almost reckless enterprise of the bold island sealers.

HEART'S CONTENT AND THE OCEAN CABLES.

A LITTLE more than a quarter of a century has gone by since the laying of the first ocean cable and the transmission of a message woke the country to wild enthusiasm and demonstrated the possibility of wedding two continents in electric bonds. The union was but a momentary and sentimental one. Almost on the day that the first message passed, the grim news spread that the cable had broken. In those days there were not wanting men of repute in the scientific world who predicted that the obstacles to ocean cable-laying were insuperable. The attrition of rocks and sand, the corrosion by the ocean brine, the necessary flaws in so long a span of cable, were urged stoutly as bars to an enterprise which might stir international sentiment, but would never, as was asserted, be a practical reality. At this distance, and in the vivid light of things done, it is curious to recall the delusive fears of that sceptical day—to find five years afterward a new cable laid, the old one repaired, and success not exciting a tithe of the enthusiasm created by the earlier failure; to be brought face to face, as a familiar and every-day fact, with the daily transmission of hundreds of sub-ocean messages; to know that

cables are laid and repaired with as much precision and certainty as the prosaic land-wire, and that stockholders look to them for dividends with as much confidence as to the railroad, the factory, or the bank; and, finally, remembering the later marvels of electrical discovery, to look onward to an era when even the telegraph and cable may perhaps become obsolete.

On the rugged shores of Trinity Bay, Newfoundland, is Heart's Content, the great station of the Anglo-American Company, where three of their cables land. The bay, now famous in the annals of ocean telegraphy, is a body of water about as large as Long Island Sound, cutting straight into the bleak shores of Newfoundland, and, like all those shores, rocky, sheer, and fatal to the mariner whose craft strikes them during high seas. In each of the little harbors of the bay is a small group of fishing huts, and Heart's Content itself scarcely deserves the title of a village. During the winter the large bay is fairly buried in drift ice, on which teams can drive across; in the spring towering icebergs, loosed from their Arctic moorings, drift in, and, but for the vast depth of water they draw, would dash against the shore. As it is, they strike the bottom in deep water, making a mighty stir as they roll in the turbid tide, until, unbalanced by the heat of the sun, which melts them above, they fall over with a crash. During the month of August, I have seen in the bay one of these stately visitors, the survivor of a great company of bergs that entered the waters the preceding

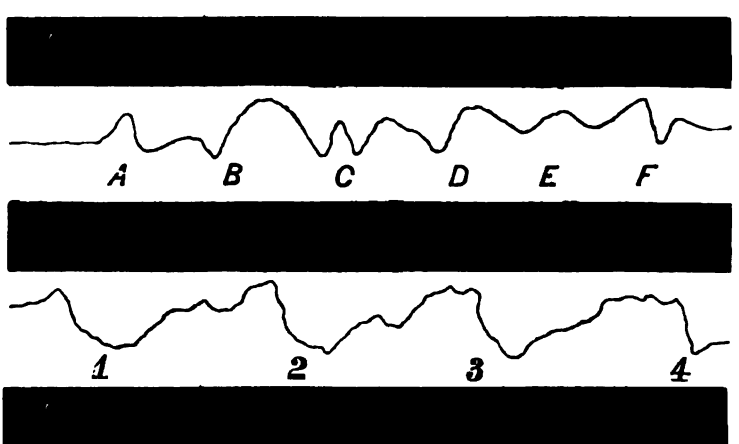
spring. The telegraphers at their station in Heart's Content have isolation with a vengeance. On the barren road to Carbonear, the nearest settlement of any size for twelve miles, one finds only a single house, and that the dwelling of a telegraph repairer. In the winter the road is almost closed by deep snow, and poles nearly as high as those of the telegraph have to be set up to mark out the path. To St. John's, forty miles farther on, is also a rough journey, and altogether the telegraphers, surrounded only by fishing huts and hemmed in by their rocky walls, have a dreary life of routine that almost makes the name Heart's Content one of derision. In all, the cable station gives employment to about thirty persons. The operators, picked men in their calling, are most courteous and intelligent gentlemen. The Anglo-American Company has to pay them well, as it should, for their life of seclusion. They each receive fifteen hundred dollars a year besides a handsome dormitory, and their annual vacation of a month each year can, at the option of the operators, be exchanged for three months every three years, so as to enable them to revisit their English homes. Many of them have families, and one of them has been in the service of the company at Heart's Content for sixteen years. But at best, shut out from the world and environed during the winter by deep ice and snows, existence must be terribly dreary in that remote corner where science and civilization touch one of nature's roughest outposts.

A spacious building, looming up like a Colossus over

the low dwellings of the fishermen, contains the apparatus by which the cable messages are sent or received. Within is a glittering medley of brasswork, keys and key-boards, wheels, jars, wires, and general telegraphic paraphernalia. The air hums with the click of instruments, and the room on a working day is a hive of industry. First to attract the eye, and foremost as to interest, is the "recorder," the instrument that receives the message after its instant journey under seventeen hundred miles of water. The recorder is a horseshoe magnet, electrified by the usual circles of fine wire, and attracting a small metallic coil. The coil is hung between the magnetic poles, and by a light lever and a thread almost as fine as the strand of a cobweb, is connected with a delicate syphon hung in a little reservoir of ink. The ink is electrified, so as to produce a repulsion of the particles, making it flow more readily through the syphon, which outside is about the size of a darning-needle, and the interior tube scarcely larger than a hair. The lower end of the syphon rests against a paper tape playing perpendicularly through rollers. The whole machine is of gossamer fineness and flexibility, so as to minimize the electric strain necessary for working the cable.

Let us imagine now that a coming message has been signalled from far across the ocean at Valencia. The operator at first opens the simple machinery that works the brass rollers. On the centre of the tape, as it passes between the rollers, the syphon at first marks only a straight

line. Suddenly the line swerves to the right or left. The message has started, and the end of the syphon has begun its record. Worked by two keys, and positively or negatively electrified, the coil swings the syphon point now to one side, now to the other, along the tape. Responsive to the trained hand of the operator, the filament of ink marks out one notch, two notches, three notches; then suddenly, it may be, a high elevation or depression until the delicate line traced on the tape looks like the tiny outline of a mountain range. But it is a range whose every hill-top, peak, and valley means an alphabetical symbol to the telegrapher's eye. The diagram annexed shows two sections of the tape and the curves corresponding with several letters and numerals.



The recorder is the invention of the famous electrician Sir William Thompson. How delicate an interpreter it is

may be inferred from the fact that ten jars work eighteen hundred miles of cable between Valentia and Heart's Content, while twenty-five jars of the same electric power would be needed to work three hundred and fifty miles of land-wire; in other terms, the recorder is more than twelve times as efficient for its purpose as the ordinary Morse instrument. The recorder traces its characters on the tape about as fast as a slow penman copies a letter. Besides its delicacy of work, the recorder, as its name imports, has the merit of leaving the record of the message —a point which in a lawsuit involving an alleged mistake of a word might save the company thousands of dollars.

Superseded by the recorder, but an instrument still used as a substitute in emergencies, is the reflector. It is an electric adaptation of reflected light, not much unlike the process by which a child amuses itself when darting round a room the ray from a hand-mirror. As the slightest turn of the glass will throw the reflection through a great arc, so in the telegraphic instrument a wide movement of a ray follows from a little vibration of a mirror, and there is corresponding economy of electric strain. The mirror is set in a metallic case, which when electrified gives a double motion. A bright lamp shining through a slit makes an upright bar of light, which is reflected into a dark box a yard away and plays to one side or the other of a line in the centre. Looking into the box the layman sees only a flash darting to right and left. But these double flashes give the dot and dash which in various

combinations are all the telegrapher needs to construct his alphabet. The reflector is less intricate than the recorder, but as it could not register the message it was discarded. The motive of lessening the strain on the cable, which prompts the use of both the recorder and reflector with their gossamer devices, is also the underlying cause of the establishment of the station at Heart's Content. To pass the current directly to the land-wires seemed an undue risk. Hence Heart's Content is made the resting-place of the messages over three cables, and there they are transferred to land-wires and forwarded to their destination in the usual telegraphic way. In addition to the three cables landed at Heart's Content, the Anglo-American Company operate the French cable running from Brest, France, to the island of St. Pierre, south of Newfoundland, and thence to the coast of the United States.

The work of locating a break or flaw in the cable—a process seemingly so abstruse—is, with the present improved instruments, comparatively quick and easy. Discarding technicalities, we may say simply that the whole electric potency of the cable when fully charged is known, and the same can be quickly ascertained of the two parts created by a break. A delicate machine adjusted to the nicest fractions discloses the electric units or "ohms" in each part, and as the number of ohms to the mile is known, the miles and fractions of miles in both parts can be found out at each end of the cable. In the case of a

clean break the locating of it takes about fifteen minutes. But a very angular break, or a flaw, makes perturbations of the measurement which it, now and then, takes some hours to rectify. The usual cause of breaks or flaws is attrition on rocks or sand; and sometimes a break in very deep water indicates that sea-currents of considerable force prevail there, contrary to the generally accepted theory that deep-sea waters are always placid. Most of the fractures, however, take place in shallows, and many of them are due to the dragging anchors of the fisher craft. In two or three instances the cables have evidently been snapped by enraged or hungry fish.

The cable steamer Minia lies constantly in the harbor of Halifax, fully equipped and awaiting her calls to service. She is a staunch craft of some three thousand tons burthen, and with unusual beam for a vessel of her length. Her work consists entirely of repairing, the laying of full-length cables being relegated to large steamers like the Great Eastern, the Hooper, or the Faraday. Occasionally, however, the Minia is required to relay considerable parts, and she carries regularly in her tanks about six hundred miles of fresh cable. The tanks, some twenty-five feet in diameter, reach far down into her capacious hold, and the cables are coiled in a deep layer around a central core. The larger the core the less the capacity of the tank, and, on the other hand, the smaller the core the greater the danger that the paying-out cable will kink and foul when it reaches the smaller central coils. To partly avoid

this difficulty, a large force of men—sometimes as many as thirty—are placed in a circle around the interior of the tank, and each man as the cable lifts before him holds down the adjacent coils and sees that the cable is free. It not uncommonly happens that one of these watchers grows careless and is knocked by one of the ascending coils heels over head among his fellows, for the modern cable steamers often pay out the coils with a speed reaching seven or eight miles an hour. After running from the tanks the cable passes over a series of wheels, fitted with a powerful system of brakes, which can be applied instantly. Then it goes over a wheel, at the stern, and is dropped into the ocean. In picking up the cable the coils pass over a large wheel, thence to the tanks, where they are carefully relaid. The modern first-class Atlantic cable is made of (1) seven central strands of fine copper wire twisted together; (2) a tightly fitting tube of solid gutta-percha; (3) a wrapping of jute; (4) a covering of thick wires, and (5) a final wrapping of thick tarred tape several inches wide. The deep-water cable of these days, when finished, is about an inch in diameter, the shore cable often an inch and a half. In paying out as well as taking in cable the utmost care must be used, and even then at times an unexpected kink may not only break the cable but tear to pieces the wheels, brakes, and other valuable machinery.

The machinery used for picking up a cable in both deep and shallow water is of the most simple description. It

consists of a rope about an inch and a quarter in diameter, made from twisted strands of the strongest hemp, with interwoven wires of fine steel. The grapnel at the end is merely a solid shaft of iron some two feet long, weighing about a hundred pounds, and prolonged into six blunt hooks which very much resemble the partly closed fingers of the human hand. In picking up the cable in deep water the Minia, after reaching the waters near the break, lets out her rope and grapnel, then takes a course at right angles to the cable and at some distance from the fracture, so that the broken end may not slip through the grapnel. The grapnel rope is attached to a dynamometer which exactly measures the strain on the rope, and shows unerringly when the cable has been caught. If the grapnel fouls a rock the strain rises very suddenly and to a high point; but as the exact weight of the cable is known, the dynamometer signals by the steady ratio of increase its hold on the cable far below. The ease and certainty with which the cables are picked up in these days are amazing. Awhile ago one of the lines of the Anglo-American Company was caught without trouble at a depth of two and a quarter miles near the middle of the Atlantic. Captain Trott, of the Minia, who has won great fame for his skill and ingenuity in cable matters, recently picked up the French cable one hundred and eighty miles off St. Pierre, and in four hours from the time the grapnel was let go had the cable spliced and in working condition. The splicing is a work of great delicacy and skill, and when

accomplished by trained fingers the spliced part can scarcely be distinguished from the main cord. So rapid has been the improvement in perfecting the modern cable, that the resistance to the electric current has been reduced to one quarter what it was twenty years ago, while the duplex system of sending and receiving messages doubles the capacity of every new cable that is laid. The working life of the modern cable is about thirteen years.

The work in the operating-room at Heart's Content has brought out a number of curious facts about cables and cable-operating. For instance, New York City sends and receives about two thirds of all the cable business of the United States. Philadelphia comes next, then Chicago; while some of the smaller Southern cities, with their messages relating to cotton sales, outrank large Northern cities like Boston, Baltimore, St. Louis, or Cincinnati. It amazes the telegraphers at the cable station to tell them of the importance of places like New Haven, Albany, Troy, or Buffalo, from which the cable business is so small that at Heart's Content they are supposed to be little towns. The regular price of a message at the time of this writing is fifty cents a word. Yet, a few years ago, when competition reduced the rate to twelve cents, the increase in the number of cable messages was relatively very small. As the competition was comparatively brief, however, the test of cheap rates could scarcely be called a fair one. As proving the importance of

choosing steady men in cable work, the example is cited of a subordinate at Valentia charged with the duty of making certain complex connections with the wires there. One day he became intoxicated, and, as no one knew the intricate connections, communication between two continents was well-nigh stopped for a large part of a day until a drunkard could recover from his spree.

There is a side half romantic, half weird to the life of the telegraphers shut in their workroom at Heart's Content. Day and night the messages of two continents pass thither, make their brief stay, then flash again their meaning to souls far distant on the old or new hemisphere. In storm and tempest, 'mid winter snows and summer blossoms, these men, working often almost within earshot of the crash of Arctic bergs, interpret the gossamer characters traced in rise and fall along the mystic tape. The knell of death, the wail of sorrow, the story of fortunes made or lost, the tale of wreck by land or sea, the crises of statesmen, the record of crime, the cry of battle, are all registered in the tiny line which, passing the sun in his course, makes two continents one in their knowledge of things done and to be.

DEEP FISHING IN TROPIC SEAS.

NOTHING excites more the wonder and delight of the winter tourist to the Bahamas than the pellucid clearness of the local ocean waters. A few hours after leaving the Gulf Stream on the southward voyage the change begins. The blacker depths of the ocean are there left behind and the soundings of the Bahama channels are entered. Around in all directions, though for the most part too far away to be descried, are the islands of the Bahama group, land-locking the waters and stilling the waves. But it is not this softening of the temper of the sea—albeit agreeable to many voyagers—that attracts so much attention, as the beautiful alteration of sea-color. The ocean now takes on the hue of a clear spring sky. It is not like the dirty green of our Northern marine waters, but a dark translucent blue. Near the shore this color brightens suddenly into an opalescent tint, quickly, perhaps, shifting to black where the bright coral reefs slope off to dark weeds. Dipped up in a glass the sharpest eye detects no speck in this tropical fluid, colorless as the purest air. We talk of pure sea-water at Newport, Long Branch, or Cape May. But the term becomes a far-fetched metaphor after seeing what ocean water is in regions like the Bahamas, where no alluvial sands discolor it, where the coral

débris seems always to sink, and where the sea when calm appears to be only a sort of lower stratum of the luminous ether above. Where the water is, say, ten feet deep, it seems as if one could touch bottom with a cane. The steamers, of almost two thousand tons burthen, which enter Nassau harbor appear by some magical potency to be floating on the sand; and in the profounder depths of sixty or seventy feet the naked eye, discerning the reefs apparently some fifteen feet down, is even worse deceived. When bathing in this fluid, never even in winter so cold as the warmest summer seas of Long Branch, one is surprised to find himself over his head in water that seems only waist-deep, while the body of a big man is shortened by the optical illusion into the proportions of a dwarf.

Dame Nature, in accomplishing her work in tropical climes, always seems to have made the sad mistake of doing every thing for the eye. She gives pure air, but it is full of lassitude. She creates a vast range of most luxuriant vegetation, but her trees are small and their fibre tender. She begets a huge variety of fruits beautiful to look upon, but if we except the orange, lemon, pineapple, and banana, they are for the most part insipid and of species which decay so quickly that they are rarely or never seen in our Northern markets. In tropical seas her work is of the same kind. Her fish seem made to feast the esthetic eye rather than the craving stomach. In those crystalline waters, where clean living is the necessary habit of the finny races, one might expect every fish to at

least rival the flavor of the shad, trout, and other dainty dwellers of Northern streams. But, instead, every thing seems to run to color. The supremest tints of beauty—gold, orange, blue, green, and red—are lavished wantonly on the tropical tribes of the sea. Even fish of Northern species when found in the tropics have some added line of beauty in gold or crimson. The porgy, for example, is one of the fish most abundant in Bahama waters. But in the tropics, unlike his Northern kin, he has a scarlet mouth and deep lines of gold on his scales. Something in the clear water seems to generate these vivid tints, and by the same occult power extract all fishy esculence. For tropical fish, with one or two exceptions, taste just alike. They have a negative, insipid flavor when cooked —something half way between fish and cheap beefsteak,—and when first caught they smell more like fresh meat than fish. Nay, many of these fish are really poisonous. There is one well-authenticated local case, that records how some passengers on a Bahama-bound schooner caught a tropical fish, called the barracuda, a fierce creature, often growing to great size, and much resembling in structure and habits the fresh-water pickerel. The fish was cooked, and every man who ate was seriously poisoned, while one of the victims became almost a confirmed invalid in consequence of that terrible repast. Nevertheless the barracuda at certain seasons and under particular conditions is eaten freely by the Bahama negroes; and it may be seen, when sun-dried, for sale in the Nassau markets. Other fish,

however, some of them most beautiful specimens, are eschewed, and as to some of them most absurd notions as to their poisonous qualities prevail among the negro race. The squirrel fish, for instance, must never be touched between the eyes, for yellow fever is supposed to be certain to ensue.

For fifteen miles along the northern shore of New Providence Island, the formation of the sea bottom is most singular and interesting. The first mile from the shore slopes gently outward until a depth of eighty or one hundred feet is reached. Then comes a submarine precipice. The coral reef suddenly drops down like a cliff, edged with rough rocks and cut by deep fissures, in which many an anchor of the poor fisherman has been caught and lost. To fish successfully, therefore, a shore wind is almost essential, so that the anchor may be cast in soundings while the boat "tails" off over the submarine cliff, in whose cracks the fish find refuge from sharks and other enemies. To get his sail-boat in exact position over this cliff is the Nassau fisherman's highest art. Long he scans the water as his craft nears the "edge of the ocean," as the dip is locally named. By the change in the water-tints he knows every shifting of depth, but in addition he must note carefully the direction of wind, the water currents, and the probable drag of his four-toothed anchor. Then at last comes the order to "drop." The rusty flukes go over with a splash; the long rope runs out ten, twenty, thirty fathoms, until the welcome

strain shows that the teeth have caught the rock. The sails are furled, the little vessel swings to the wind, one of the colored crew breaks a big "conch" for bait, dropping the bright fragments of shell overboard to attract the fish. Then the long double-hooked fish-lines, as large as small ropes and furnished with a sinker like a plummet, are dropped over, and the sport begins.

Fishing in the tropics, as in every spot where the writer has ever cast his lines, is vested with most acute uncertainties. Not only most wise in their generation, but decidedly whimsical and capricious are these scaly races of hot zones. I have cast my baited hook in a school of them so thick that it gave dark color to the white coral bottom, yet without a suggestion of a nibble. At other times, it is said, every fish rushes madly for the bait as though at the point of starvation, and they are hauled up two at a time, until the fisherman's rasped fingers can endure the pain no longer. In some respects, too, this is the merest mockery of sport. To pull up hand over hand a hundred and fifty feet of mimic rope; to barely feel the struggles of a four-pound fish at the other end, so tense is the strain of the line with its huge sinker; to find the captive when he reaches the surface so exhausted by his upward trip that he is scarcely as gamesome as so many pounds of floating wood; and to wait several minutes before even the heavy lead can take the line to the needed depth,—all this has its smack of the ridiculous for the sportsman who has pulled in a ten-pound bluefish off

Barnegat, or played an Adirondack trout on his eight-ounce rod. But, on the other hand, tropical fishing has special charms and novelties of its own. The immense variety and wonderful shapes and colors of the fish make one watch with eager excitement for each new specimen hauled over the rail. It may be the tropical turbot, with blue-and-gold markings, and his dorsal fin six inches long; or the pine, scarlet-red, dotted with black spots; the rockfish, variegated as the rainbow; the hog-fish, with teeth counterfeiting tusks, and a snout opening like a telescope; the crimson snapper, the silvery margate, the red-mottled grouper, and twenty other species might be named to fill out a list, none of which would lack strange attributes of color or form. I have known a friend, after a few hours' sport, bring in no less than nineteen different varieties of fish, which fairly transfigured the interior of the boat with their mass of radiant hues. The "water-glass," so-called, also adds a unique attraction to this deep-water fishing. It is simply a window-pane set into a box which is fitted with handles. Placed on the waves, it makes a smooth-water surface in contact with the glass, through which the trained eye of the negro mariner looks down to incredible depths. Often his "Look out dere, massa, dere 's a big porgy at yer hook!" will signal a bite, and be followed presently by the coming of the identical fish over the rail. It smacks of the strange and supernatural, this prediction of fishy doings a hundred feet down in the brine.

Or take the glass yourself, if momentarily tired of the sport, and a little practice will show you a fresh realm of wonders—the deep bottom, with its rocks, weeds, and sands; the fish moving here and there; the graceful curve of the long fish-lines, as they taper away to nothingness far below; and every now and then an upward gleam of whiteness as a companion draws up a new victim, whose struggles can be marked fully a minute before it is dropped, gasping on the boards.

A volume could be written about the habits and traits of the tropical sharks. In the teeming fish-life of these tepid waters they find abundant food, all the more easily captured because of the transparency of the sea. It follows that there is an enormous development of shark-life, both as to number and species, as compared with more temperate ocean climes. In his relations with the fisherman the shark is a vile marplot. You may be gleefully hauling in fish after fish, and congratulating yourself on an hour or two of sport. Suddenly, just as you have started a four-pounder upward, you see a gleaming white flash. Pull rapidly as you will, but you will pull in vain. Thirty feet more of line, it may be, are drawn in, when the hook seems to strike a rock. Perhaps the check is but momentary; then on drawing in you find only the head of a handsome fish whose body has gone into Mr. Shark's maw. But more likely you have put too much strain upon the line, and in that case the shark, fearing the escape of the prey, has bolted hook, fish, and sinker, so that only the

severed line comes back. The negro fishermen, with the aid of their water-glasses, have been able to make a thorough study of the habits of these pirates of the deep, and give the shark a high character for cunning. As these negroes aver, a shark will sometimes follow a boat for a mile until it comes to anchor. Then, lying in the shadow of some subaqueous rock, so as not to frighten the fish from biting, the shrewd fellow will dart out the instant a hooked victim begins his ascent. With a hungry shark around, not more than one out of three hooked fish ever reaches the rail; and there is proportionate and vexatious loss of hooks and sinkers. After his novel fishing is ended the shark rids himself of these impedimenta by rubbing his nose and lips against projecting rocks. Sharks of the moderate size of ten or twelve feet may sometimes be caught with a rope and huge hook hung to a chain. But even then they have a clever way of following up the line, turning on the back, and by a side snap of the teeth cutting the cord as cleanly as with a knife. The larger and fiercer species of tropical shark, from twenty-five to thirty feet long, have never been caught at Nassau by line, and the negroes tell wondrous tales as to the chain hooks and huge cords broken in tackling the big fellows. We had lately an illustration of their voracity: A negro sailor had caught one day an ordinary shark ten feet in length and weighing some two hundred and fifty pounds. He left the creature over night on a line attached to his boat. The next morning only the head was found. It

had been severed from the body by a single clean cut just behind the gills. As a rule, when once the sharks get actively at work around the lines the legitimate sport ends for that anchorage in fifteen or twenty minutes, as the edible fish fly to the rocks for protection. But sometimes the fishermen, tying together a bottle and piece of iron, drop it down on a cord attached to the boat. The rise and fall of the craft on the waves keeps up a constant tinkling below, and, as water is a good sound-conductor, the sharks flee in terror. A ray of sunlight cast downward through the water-glass often has a similar effect.

Manifold are the curious things disclosed in the fish-craft of these clear deep waters. A few moments after a fish has lain on the boat's bottom you will see its abdomen enormously distended. Examine it more closely, and you will find the wind bladder so swollen that it protrudes far into the mouth. The simple explanation is that the bladder has expanded from the relaxing of the pressure to which it was adjusted by nature at thirty fathoms of depth. Place this fish while still alive on the water, and it will scarcely stir, much less swim downward. But prick the abdomen with a large pin and the air rushes out, the internal mechanism readjusts itself, and the fish darts away. In several species of fish this distension ensues instantly, after they are pulled within thirty or forty feet of the surface. Then, if they become unhooked, they struggle vainly to go downward, and at last float to the surface to die. Among the unique local methods of

fishing is that used by the negroes to take the Jewfish, a handsome many-colored species often growing to a length of several feet, and with a fatal habit of lying sluggishly on shallow bottoms as if asleep. The negro divers, who rival the fish in their swimming powers under water, take down a hook hung to a cord, approach the Jewfish from behind, and slip the hook under its nose. A sudden jerk from the confederate fisherman using his water-glass above does the rest, and the Jewfish goes to his death. Apocryphal as the story sounds it is but a second-rate marvel amid the genuine fishy wonders to be found without number in the bright waters of the tropic zone.

SHADOWS IN CUBA.

"CUBA is a Spanish Ireland," is a sentence by which, after a very brief trip through the island, its political, social, and economic conditions can be summarized. Of course some flaws may be detected in the analogy, but in essential points it holds good. Within the bounds of the "Gem of the Antilles," is a fierce war of races of a genuine Hibernian type. There, too, among the lower classes, are the squalor, misery, and destitution that impress the eye so painfully in Mayo or Tipperary. With a little more mud and a little less thatch-work the likeness between the hut of the Cuban freedman and the cabin of the Irish peasant would be complete. Finally and most solemn of all is the terrible disparity to be seen in Cuba between the natural resources of the island and the physical condition of the people. The beauty of its landscapes, the fertility of its soils, its vast productiveness, its fine harbors, its clear rivers, are a perfect revelation to the American visitor. Nature seems to have done every thing to make the island, man every thing to unmake it. The Gem of the Antilles is literally an Irish emerald with a tropical setting.

Before you even reach Cuba you are confronted by those evidences of backwardness and semi-barbarism that

increase by a huge ratio after landing. You are bound, we will suppose, to Matanzas, a city of some thirty thousand inhabitants, with a deep capacious harbor opening directly on the ocean, and for that reason dangerous to approach by night. Yet this harbor, in which not very long ago I counted fifty sail of anchored vessels, has no light-house. There is a harbor light at Havana, and one at another Cuban port; but these two lights are all that can be found on the Cuban coast-line of two thousand miles. Once within the harbor the ordeal of Custom-house vexations begins. The steamer that bears you has entered port at eight o'clock in the morning, and must wait the coming of the surly Custom-house officers. One hour, two hours, three hours pass. The impatient passengers stamp the deck with maledictions deep and pointed. At last, in the far distance, the Custom-house barge, a lazy craft of the gondola species is sighted. Her officers know that the steamer's voyagers are waiting; but before the mediæval craft heads to the steamer she must visit half a dozen sloops and schooners, with fifteen or twenty minutes' stay at each. Then your passport must be surrendered, to be sought out with fresh bother on shore. You land in a cranky row-boat—there are no ship wharves at Matanzas—and must wait once again the examination of baggage; and finally, after having undergone treatment that could not have been much worse if you were a filli-buster conspiring against the peace of his Spanish Majesty's Cuban dominions, you reach your hotel. These

abominable Custom-house practices at Matanzas have been officially brought to the notice of the higher Cuban authorities by the steam-ship companies, but thus far without the slightest effect.

Matanzas itself is a fair specimen of that dry-rot which, under Spanish rule, seems to have fallen on the whole island. The city, evidently old—for decay only comes with age,—is probably as dilapidated a place as can be found on the continent. The Custom-house wharf, with its rotted floors, broken timbers, and tottering foundations, satirizes the really important commerce of the port. The ordinary buildings of the city, outside of a few of the better class of residences and mercantile houses, are musty, battered, and forlorn. Business drifts rather than moves through its streets, and the old esplanade, weed-grown, rough, and decorated with shattered remnants of statuary, mocks its ancient splendor. Take a volante and drive through the valley that trends from inland down to the city. Within a pistol-shot of the suburbs the chief road becomes a chaos of rocks, deep ruts, and mud holes. An unworn drive through a New England cow-pasture would be a boulevard in comparison with this pathway, which they call a "good" road in Matanzas. But proceed a little farther on. The valley now opens into a beautiful expanse of fertile land. There is a square mile of this level country within a rifle-shot of a city of thirty thousand people, yet not a square rod is improved or under cultivation. That land at twice the distance from a Yankee

city would fetch its thousands an acre; at Matanzas it can be bought for a song.

An inquiry as to the causes of this backwardness always brings out the reply: "Taxation." "Do you know," said a prominent Cuban citizen of Matanzas in conversation recently, "why that plot of land to which you refer is not improved? It is because, if any one improved it, the increased taxes would eat it up." All through Cuba this grievous taxation is the burden of complaint. The whole island groans under its load of direct and indirect imposts. They take so many forms that, after considerable effort, it is impossible to reach any just estimate of the total tax under which the ordinary property-owner labors. There are taxes on imports and taxes on exports—for instance, five dollars on every cask of sugar that leaves the country,—taxes on sales, taxes on legacies, taxes on rents. To enumerate the petty fees and perquisites which hang on the system, like fungi on a rotten log, would take a volume. But let an instance speak for all. A young Cuban friend was to be married during the writer's visit to the island, and was enduring the tedious civic and ecclesiastical formalities preliminary to the ceremony. He asserted that the essential legal fees—for certificate, notice of marriage, and so on—would amount to one hundred dollars in paper money, the equivalent of fifty dollars in our American currency. The legal fee of the priest alone was fifty dollars, and it was sure to be rigidly exacted.

The nature and spirit of this wretched scheme of extortionate public fees may be inferred from the passport system, which is still in full force at the Cuban ports. Every American who goes to Cuba must get a passport at a total cost of eleven dollars in our country. But at Nassau, an English port, the Spanish Consul sells them for four dollars, and asks no questions of the applicant, except one or two purely formal ones. There is an American Consul at Nassau, but, curiously enough, the American visitor goes to the Spanish official for his passport, and that functionary eagerly questions the pursers of incoming American steamers as to the number of Cuba-bound visitors needing the documents. Practically, of course, this passport system is a mere farce regarded as an international precaution. But it serves to tax strangers who go to Cuba to spend money, and therefore the extortion is kept up. A curious contact it is with New-World barbarism when the visitor in a country close to our shores finds that he must get a passport, must have it viséd at the Cuban port of entry, viséd again at the port of departure before he can leave the island, and have to pay a fee every time the document is scrutinized.

Official corruption is apparently rampant all through the Cuban civil service. Said a Cuban tax-payer to the writer recently: "It would be bad enough to have to pay the awful taxes we do, but it is doubly sickening to have to pay those taxes and know that an immense proportion is coolly pocketed by the Spanish officials."

This same gentleman showed me a local tax bill for his house fully paid and receipted. He then pulled out two later unreceipted bills covering exactly the same period, but with "penalty" taxes—for delay—added. The conclusion was irresistible that the first tax had been stolen without entering it on the books at the Tax-office. There was the best authority for a case where a planter who had gone up to pay taxes on a plantation sold for three hundred thousand dollars had been invited by the officer to fix the amount at half the sum and "divide" the tax on the balance. Indeed, it is perfectly amazing to find how universally accepted is the notion of deep-seated and general official swindling. Some little incidents throw a side-light on the evil. For instance, the regular fee is twenty-five cents for getting a passport viséd at Havana before leaving the island. Visit the Government office in the city and try the experiment of not offering an extra fee. You may wait one, two, three days before the passport is handed back. But offer a dollar, and "presto," the little instant of work is done and the document returned. If people who ought to know—American residents and respectable Cubans—can be half believed, the degree of public swindling would be positively ludicrous, could crime ever be made funny. They aver that Cuban offices are regularly bartered in Spain to men who come over as civic pirates to prey on the island. I have heard of the case of one Customs officer who came from Spain after paying there ten thousand dollars for his

place. In two months, as the story goes, he was removed, that his position might be sold over again. "Never mind," said he, "in those two months I made twenty thousand dollars." No doubt many of these stories are exaggerated or fictitious; but if every one of them were a lie, the undoubted and palpable fact that every one believes them seems enough to sap the confidence and energies of a sturdier race than is found in Cuba.

The vices of the Spanish office-holding class are reflected deeply on those lower orders with whom the stranger has to deal. Of all the places in the world prolific in petty swindles Havana takes the palm. The hucksters, money-changers, hotel interpreters, and everybody of the genus, cheat with a coolness and a hardihood that smack of genius, and, when detected, calmly lower their price, smiling as at a joke. They have easy scope for fraud in the currencies of the island, which are enough to puzzle more experienced brains than the tourist's. Paper money (depreciated in gold at this time fifty per centum and not a full legal-tender), Spanish gold, Mexican and American coins, greenbacks, all circulate in most puzzling relations of value. Many of the paper bills and shinplasters are so faded, torn, and dirty that the wildest stretch of fancy is required to attribute to them value; while the complexities of foreign exchange caused by this hodge-podge of hybrid currencies are most absurd and whimsical.

Between the Cubans proper or Creoles, who are the old residents of the island, and the Spaniards there is undying

hatred. All the public offices of trust and profit are filled by these imported Spaniards, who constitute a ruling class and bureaucracy of the most pernicious type; while the planter class and most of the property-owners are Cubans. Property interests on the one side are thus arrayed against a predatory oligarchy of petty official tyrants on the other. The bitter feud between the two Spain apparently makes no attempt to heal. The Cubans pray for independence, for annexation to the United States, for any thing which will free them from Spanish dominion; while the Spaniards preserve a disdainful air of authority that is peculiarly galling to the subject class. The Spaniards, however, are in constant fear of an outbreak, and Spain has even now twenty thousand troops on the island. Some of the local views on the recently closed rebellion give one fresh hints on its real character. Said a planter—who was as fierce as the rest of his class against Spanish rule—to me some time ago: "That rebellion was really little better than a series of forays by bandits. Why, half the time the rebels and the Spanish troops were in collusion with each other to rob the Cuban planters. When a planter happened to be beyond reach of one of the hostile parties, it would send word to the other that he 'had got something left,' and a descent on his property would soon follow. The Spaniards robbed and plundered as freely as the rebels, and without regard to the political opinions of the victim. A favorite Spanish trick was to impress a planter's oxen, on the plea that they were needed to haul

supplies. The next day that planter would find his animals on sale in some neighboring town." Nevertheless, that rebellion cost Spain at least one hundred million dollars in hard money and the lives of more than a hundred thousand men, most of them victims of yellow fever. To have mastered even the rebel guerillas they must have been better types of fighters than the thin-legged regiments of volunteers to be seen in Havana. These mimic toy soldiers, with their mincing quick-step and short stature, recall a drill of Amazons in a stage spectacle. It seems as though a Yankee housewife could spit a whole platoon with a bodkin, and one German or British regiment annihilate an army.

The natural and exotic evils in Cuba, serious enough of themselves, are further complicated by the reorganization of labor systems following the emancipation of the slaves. After the year 1884 all slaves more than forty years old will be free, and by 1890, under the sliding scale of emancipation adopted, there will be no more slavery on the island. Ten years—emancipation began three years ago—is a pretty short time for revolutionizing the labor system of a country so languid and inflexible as Cuba, and the planters fear most disastrous results. Most of them defend the old slave régime, asserting that its evils were greatly modified by the legal checks on whipping, while any slave with ambition could, by working extra hours, purchase his freedom. They look forward with well-founded apprehension to the time when a most degraded

class of negro laborers will be set loose on an island where a tropical sun and abundant fruits give the wherewithal of subsistence almost without toil. On the subject of Chinese laborers, of whom an amazing number are seen on the island, the opinions of planters are divided. Some planters praise the thrift and industry of the coolies; others declare them slow, weak, and inefficient. The truth seems to be that while the Chinaman in Cuba is a steady toiler, he is so physically feeble as to be no match for the negro slave. As for white labor, it is out of the question under the torrid sun beating down for eight months in the year like a celestial trip-hammer. Even now, at the later edge of winter, the tourist feels that strange morbid languor which seems the necessary curse of tropical races. Was it not Emerson who said that the goddess of civic liberty had been carved out of snow and ice? The mind, at any rate, constantly reverts to that metaphor when it contemplates the long category of civic and economic evils which infest Cuba in common with so many other countries of the hot zone.

The climate or some remoter cause inflicts its spell on both Cuban physique and character. There are some fine specimens of manhood among the planter and professional classes, and not a few, who have been educated abroad, are most courteous, hospitable, and cultivated men, with something of the old Castilian sense of honor. But they are physical and mental exceptions to the ordinary Cuban, who is thin-flanked, low of stature, hungry-faced, and

seemingly the victim of perpetual jaundice. How far his inveterate smoking breeds his low physique is a pertinent question. The speculative passion is most inordinately developed among all Cuban classes, and the ticket of the Havana lottery is one of the most obvious of its signs. These tickets, subdivided into twentieths, worth two dollars each, so as to be within reach of the poor, are ubiquitous throughout Cuba. Every small dealer, huckster, and boot-black has them on sale for a small commission, and everybody buys them. The Government, with its fortnightly drawings, makes, it is said, twenty per centum on all sales; but the baleful effects of the institution on the character of the people seem never to have fallen within the governmental purview.

If one may risk a slight variation of an old figure of speech, a visit to Cuba without seeing sugar and sugar-cane would be like a trip to Newcastle without finding coals. But there is one important difference. The busy city on the Tyne is the outlet of a coal region which an enterprising race are straining to its utmost capacity of production, while in Cuba it seemed at every step as though the soil had hardly been scratched and the vast capacities of the island had been almost ignored. The hundred million dollars that represents the value of Cuba's annual sugar crop in Cuba may seem a great sum, as, in fact, absolutely it is, and the country may be regarded as the saccharine centre of the world's trade. But at the best Cuba's annual sugar crop is a record of wasted opportunity. No

visitor can see her fertile lands, with only small areas under cultivation, her tumble-down plantation dwellings, her ruined sugar-mills, without being impressed far more deeply with the sense of loss than of gain.

Nevertheless, seen at a little distance, a Cuban sugar farm is a pretty and picturesque sight. It is placed usually on some broad stretch of land, rising and dropping in graceful curves. Pleasant groves of trees, glades of woodland, and far mountains, suffused in poetic blue haze, lend a lovely general effect to the picture. On one of the central curves rises the planter's home. It is often a Chinese puzzle of architecture, with no end of projecting points and piazza work, covered with lattices so as to let in the breeze while it keeps out the heat, and so lined with high colors of red or blue that in the distance it looks like a great toy box. A little way from this dwelling is a solid beam, set firmly in masonry and supporting the plantation bell. Farther away still is the vast mass of mixed-up buildings that make up the sugar works, flanked by the heaps of crushed dry cane which is used as fuel for the boiler. Then grouped at various distances from this plantation centre are the rough mud and lath houses of the negro hands in all stages of architectural decrepitude. Beyond, the eye lights on the cane fields, if one may use that term for what is rather a vast prairie of cane. It is peculiarly hard to do justice to the beauty of one of these sugar-cane oceans, its surface breaking into green waves under the wind, its solid mass of verdure still further

keeping up the watery effect, and its remoter bounds reaching far away until they almost touch the horizon. Dot this scene with stately palms lifting their tufted heads sixty feet high, with moving figures of horsemen and toiling negroes, with frameworks of loaded cane drawn by four yoked cattle, and the spectacle, seen from a distance where detail is lost, charms the eye with its pastoral loveliness.

But with nearer vision, when the outline vanishes and details are brought to clearer view, one finds grim realities of thriftlessness. Every thing seems battered, and worn, and weather-stained. There is a prevailing air of unthrift and carelessness pervading the place. The trim orchards, the clean yards, and neat gardens that go with wealth in more temperate zones have no place here. The sugar-mill is rough and unpainted, its machinery rusty, and the broken cane trodden underfoot gives it a barn-yard semblance. Even the planter's own dwelling, with its once fiery paint, has a washed-out and dilapidated look, which its interior often confirms. Worst of all are the half-wrecked homes of the negro hands, with the mud falling from yawning cracks, the timbers decayed or broken, and their outward and inward aspect rivalling the mud huts of squalid Ireland. Among these poor dwellings wander frowsy and fierce dogs, half-naked black women, and entirely naked black children of both sexes. It seems, looking at one of these dusky communities of the Cuban plantation, as though some degraded tribe of Central Africa had been

taken up and dumped bodily into one of the dirty Irish villages of County Mayo or Galway. Of course there are plantations and plantations in Cuba; and to many of the better class, no doubt, this description does injustice. But in the large majority of those I have seen most of its salient points will be recognized.

The sugar-cane, which supplies the great Cuban staple of export, produces no natural seed, but is propagated from cuttings placed in shallow trenches through the fields, two or three feet apart. The young plants spring from the joints of the buried cane, and continue thus to grow for several years without new plantings, somewhat after the manner of the asparagus of our Northern climes. But each year the growth becomes inferior, until the planting has at last to be renewed. Though at first having to be weeded, while the stalk is tender, the cane is soon left to itself when once it begins to shade the soil so as to prevent the growth of obstructive plants. Most curious of all is the change that ensues as soon as the cane begins to ripen at its lower joints. Then the long, sword-like leaves that surround the lower part of the stalk loosen one by one. Finally they drop off, and as joint after joint softens the dry leaves make a tangled thick mattress on the ground, covering thousands of acres and highly inflammable. Readers of this volume will many of them recall the common reports telegraphed during the late Cuban rebellion of the immense destruction caused by firing the sugar plantations. The explanation is to be found in the ease

with which a whole sugar crop can be set in flames by a touch of the match to this jungle of dry leaves that underlies and penetrates the standing cane. Fire is the Cuban planter's nightmare. A careless toss of a half-burned cigarette, a spark from a negro's cabin, an ignited match, may signify the loss of a year's crop and absolute ruin. Most dangerous of all, a revengeful negro has it in his power often to inflict a loss of tens of thousands of dollars on his employer. There is one clever device which the negro uses to fire plantations, and at the same time prove an alibi. He takes a light box, with a candle set within it. Equipped with this and a bunch of matches, he crawls to the centre of a sugar-cane tract. He then so fixes the candle that it must burn through the box before the flame can reach the matted cane leaves. A touch of the match does the rest, and the fugitive has time to escape and appear among the working hands long before the distant smoke and spreading flames warn the planter of the impending calamity. "A sugar crop has to be watched like a baby," said a Cuban planter recently, speaking of cane culture. If danger is apprehended, the watchers guard it at every point, and short shrift is given the black man once caught in the incendiary act. If he reaches the courts, his chances are far better than those given him by the quick bullet of the guard.

Outside of this peril of fire, sugar culture is not more precarious than other agricultural industries. But it exhausts the soil rapidly, so that its fertility needs constant

renewal by manures; and a plantation of three or four thousand acres, with its one or two hundred hands, its scores of ox-teams, its costly machinery, sugar-house, casks, cultivators, and various appurtenances, calls for a vast amount of working capital. On one of these sugar farms a few miles from Matanzas, the sugar-mill alone, with its improved machinery, cost two hundred thousand dollars. Some of the largest planters even go to the expense of ramifying the cane tract with narrow-guage railroads, two or three miles long, to bring the cane economically to the crushing mills.

To explain fully the process of sugar-making would require too technical and prosy a narrative to recite here. But the methods, for all practical purposes, may be divided into two: one, the improved process, producing the better grade of "centrifugal" sugar; the other producing the old-process, or "Muscovado," article of commerce. The cane-stalks, from four to eight feet long, cut and stripped of their leaves, are brought to the mill. Then, strewn on a broad belt, working on the principle of an endless chain, they are passed between three great rollers laid very close together and worked by steam. Thence the thin watery fluid, very sweet to the taste and yellowish in hue, passes to a succession of boiling-pans or round caldrons, where it is boiled down by slow degrees, until the crystallization point is reached, much the same as is done with the maple sap of our own country. When the last boiling is ended the product is a mass of crystallized sugar soaking in molasses.

To get rid of the molasses, the old plan, and the one still adopted on unimproved Cuban estates, is to pour the mixture into hogsheads and let the syrup drain off for several weeks through the cracks. This produces the Muscovado sugar, an article inferior in saccharine strength to the "centrifugal" product. To make the latter the sugar and molasses mixture is placed in a huge perforated cylinder, which may be likened to a great sieve. This cylinder revolves on an upright axis in another larger cylindrical vessel. Whirled then with an enormous number of revolutions a minute, the liquid is thrown out, leaving the sugar crystals dry, and doing in a few minutes, and far more effectively, the work of weeks by the Muscovado method. The crystals left behind vary in size from a mere speck to a small pea. This crude sugar has a burnt-brown tint, and tastes much like the rock candy of the confectioner. The scum that rises during the various boilings, the refuse juice and fermented molasses, are treated by distillation to make rum. So brief a description as this of sugar-making does not, however, even hint at the skill and experience exacted in the process. The sugar-maker has to treat the raw juice chemically to prevent fermentation, must know to a nicety all the variations of heat in boiling, must be able to detect and measure the degrees of crystallization, and must be versed in a dozen other points only acquired by years of experience and acute observation.

The grains, or, more correctly speaking, crystals of crude sugar still remain colored externally by the mo-

lasses. One of the local methods of whitening them, producing a "refined" article, is to place the sugar in inverted conical moulds, with a hole at the lower extremity. Then the inverted base of the cone is plastered over with a wet mixture of clay and bullock's blood. The moisture, percolating through the mass, drips out below, and washes the grains clean. When the clay is quite dry the sugar is taken from the mould, and is of a cloudy-white color, not very attractive to the eye, but with a saccharine strength that far surpasses that of the more sightly pure-white crystals turned out by our great refineries. These fairer products of the northern refinery are partly the result of a chemical process of bleaching, and Cubans always refer to their milk-white hue with laughing contempt. Their home-made article, they boast, is not only much sweeter, but dissolves completely in both cold and hot fluids, while the English and American factory product leaves a residuum.

Americans who have lived in Cuba all agree as to the ordinary character of the Cuban sugar-planter. He is kindly, hospitable, courteous, and very often an educated and refined gentleman. But he is dreadfully improvident and wasteful. The fifty thousand dollars or more which he may make in a good sugar year is often dissipated in Havana before the next year begins. His plantation is apt to be loaded with debt, and this, with the stupendous taxes that he pays and his persistency in never looking ahead, explains the miserable plight in which so many of

the rich Cuban sugar farms are found at the present time. The planter, with his mixture of good and bad traits, is an incarnate type of the island as a whole; for, allow what we will for the influence of climate on human character, it yet remains that Cuba is a natural garden-spot which man has made an artificial desert. Misrule and civic vices in a hundred monstrous forms have thwarted the gifts which Providence has heaped so abundantly on the island. Here are thousands of square miles of fertile soil prolific in sugar, tobacco, and corn, yet left untilled; mineral regions which might produce precious metals abundantly but for the fears of the Spaniards that discovery would invite American adventurers; splendid forests, where the axe is never heard; the coast unimproved for commerce, with even the magnificent harbor of Havana entirely destitute of wharves; and every thing everywhere under the universal paralysis of taxation. A country almost as large as England, and with much vaster agricultural gifts, seems relegated to a condition that borders close on ruin; yet the very size of her commerce under fearful disadvantage attests what the prosperity of the ill-starred country might be under happier rule and peopled by a race more sagacious and alert.

THE BAHAMA SPONGE-FISHERS.

ON the narrow strait between New Providence and Hog Island, forming the harbor of Nassau, can always be seen a large fleet of sailing boats, each of about eight tons burthen. They are odd, stubby specimens of water-craft, broad of beam, rising several feet from the water-line, and impressing one both with their large capacity and sea-worthy quality. On the centre of their decks is a low box, half filled with dirt, which serves as a marine hearth on which the colored crew cook their food; and the crew themselves may usually be seen on deck, lying around in lazy, picturesque groups. These odd craft are the sponge-boats, representing a local industry which gives steady employment to five hundred sailing vessels and four thousand men. They are owned by ten local firms, which export sponges worth three hundred thousand dollars every year to all parts of the world. Nassau, indeed, is asserted to be at this time the leading sponge port of the globe, and without that trade she would quickly lapse into what she is not so very far removed from now—absolute mercantile nothingness.

Naturalists have wrestled long and bitterly over the nature and origin of the sponge. Up to not many years ago most of them agreed on classifying it simply as one

of the infinite series of submarine vegetables. Later scientific opinion, however, sets down the sponge as an animal, or rather a bunch of minute animals, of low organism, cell-shaped, equipped with a stomach and digestive vessels, throwing off from their bodies masses of fecundated eggs, and developing in combination with each other that fibrous mass which ultimately reaches our markets as the sponge of commerce. Take one of these masses which we call a sponge and examine it more critically. It will be found to be a group of small fibrous cells which, after ramifying more or less, connect with large round apertures penetrating far into the sponge mass. By suction, or some more occult process, the sea-water is drawn through the smaller cells and their partitions. The living organism then takes up from the passing fluid and devours the minute *algæ*, on which it is supposed to feed. The water, then, loaded with excrement, pours outward in a constant current through the larger orifices. A big sponge has therefore been aptly likened to a subaqueous city, whose inhabitants take up food from the water that passes their doors and discharge the residuum into the large round channels which represent the sewers. Take the world over, sponges appear in so many species, and with so great a diversity of living organisms, that the discussion of the whole subject would take us too far into hazy battle-fields of science. Suffice it only to say here that Haeckel, the famous German naturalist, contends that the sponge is one of the early "missing links" and

sheds most luminous scientific light on the remoter methods of evolution. So that contemplating one of these inert masses of fibre hanging prosaically in the drug store, evolutionists may regard it with something of the reverential regard due to a protoplasmic ancestor.

The living sponge, when first taken from the waters of the Bahamas, differs almost as much from the commercial article as a human body from its own skeleton—for practically what reaches the market is partly the skeleton, partly the dwelling, of a bunch of sea-organisms. When first pulled from the rocks where it grows, the sponge looks like a corrugated mass of putty. It is drab in color, exceedingly heavy, has a sickening odor, and is suffused by stringy mucus which drops from it in long viscous lines. The external pores are partly closed by a sort of sea-bug which finds refuge in them, and must be an annoying interloper to the sponge-builder; while often a red sea-worm an inch or two in length is found far within the spongy fibres, whither it has worked its way. What is the exact function of the mucous fluid does not yet appear to be clearly settled. But it is certain that when taken from the sponge and placed on still bottoms, new sponges are propagated from it; and if two pieces of the same living sponge, or of different sponges of the same species, are laid side by side on the sea bottom they soon grow together. The vitality of the sponge, in fact, coupled with the decrease of the supply, suggests that ere many years artificial propagation may have to be used.

The negro sponge-fishers who ply their trade among the Bahamas are a race of seamen not too regular in habits or morals, and living a sadly monotonous life of exposure and privation. Their voyages to the sponge fisheries last each for six weeks, during which they live crowded on board their craft under conditions of hardship which in a clime less salubrious would be fatal to health and life. The sponge firms "find" for them the boats, supplies, and equipment which they use on their six weeks' trip. The sponge bottoms most sought at this time are on the coral beds at the south side of Eleuthera Island, fifty miles east of Nassau. With a good wind the fisheries are reached in eight or ten hours from that port. Then the real toil begins. Lying on his chest along the boat's deck, the fisher with his water-glass—a pane set in a box fitted with handles—looks down forty feet into the clear depths. With one hand he grasps and sinks a slender pole, sometimes forty feet in length, fitted at the end with a double hook. The sponge, once discovered, the hook is deftly inserted at the rocky base, and by a sudden jerk the sponge is detached to be brought up on deck. This curt description of what seems the simple work of sponge-fishing gives no idea of the real skill and exertion needed. The eye of the fisher has to be trained by long experience to peer into the sea and tell the commercially valuable sponges from those that are worthless. He must have a deft hand to control the swaying hook forty feet down so as to detach the sponge without a tear.

Above all, while doing this with one hand, he must manipulate with the other the water-glass as the waves sway it sideways and up or down. The strain on eye and body is most severe, to say nothing of the cramped position and exposure to wind and wet which first and last make almost every sponge-fisher a victim of acute rheumatism. Yet with all his arduous toil, a faithful sponge-fisher earns not more than fifteen dollars a month besides his living on the boat, which barely deserves the name of existence.

All the Bahama waters abound in sponges of great variety, but many of them worthless for the market. Those that are good for nothing else are often most beautiful for curiosities. They take most wondrous and striking shapes—now a cup, now an old-fashioned drinking-horn, anon a great bunch of mossy, cup-shaped growths, and frequently foliated, like the tree-coral. A cup-shaped sponge, found some years ago in Bahama waters, and said to be the second largest in the world, measured seven feet in circumference, and its walls from four to six inches in thickness. Up to two or three years ago the Bahama fisheries showed signs of exhaustion, but the discovery of the Eleuthera bottoms has proved a godsend to the fishermen, and is likely to supply the markets for some years to come at least.

Next comes the process of preparing the sponges for export. First they are either placed on deck under the tropical sun or hung in long festoons from the little vessel's mast. In either case the heat of the sun in a few

days kills all the living organisms within the fibre and loosens them for the next process. Then the sponges are dumped into a sort of water-cage made by driving a circle of small piles a few inches apart from each other in the sand. Through these piles the tide plays violently back and forth, washing away from the sponge after a few hours the sand, dead animalculæ, and other impurities with which the mass is clogged. During these operations the sponges emit a most fetid and revolting odor, but a final washing leaves them with that not unpleasant flavor of the sea with which they reach our marts. Usually at Nassau, where the bulk of the Bahama sponges seeks a market, they undergo no process of purification other than has just been described. But sometimes they are immersed in a bath of diluted hydrochloric acid, which not only bleaches them but dissolves what few impurities have been left. After the final drying sponges are assorted, baled, and then are ready for market. The grades and qualities are numberless. There are, besides others, the "sheep wool," selling for about one dollar and seventy-five cents a pound; the Abaco velvet (so-called from its velvety fibre), worth about one dollar and ten cents a pound; and the "glove," "yellow," and "grassy" varieties, all selling as low as fifty cents. Before being baled, it should be added, the rougher kinds of sponge are trimmed with shears and the big sponges cut in sections, each about as large as a cocoa-nut. The test of the best sponges is their soft woolly surface under the touch, and

above all the toughness of the fibres, which can readily be ascertained by tearing one or two of them apart. The Bahamas, though prolific in sponges, produce few of those high qualities, which are used for surgery and other delicate work. These come from the Mediterranean Sea, where divers bring them up, and some of the finest grades have been sold as high as from fifty to one hundred dollars a pound.

In some of its broader phases its sponge industry gives Nassau some local features of rare novelty. The little boats thronging its harbor, the chattering crews, the warehouses lining the strand, the "Sponge Exchange," where sponges of every grade and shape and size may be seen by the thousand, are specialties of the port's commerce not to be found elsewhere in the West Indies, or, perhaps, in the world. Sponges cover the wharves, their broken and tattered masses float over the harbor, great heaps of clippings line the sands, and, cast up by the waves, cover the beach far below and above the city. The negro driver, at command, will plunge from your pleasure-boat into the clear waters of the harbor to bring up a fresh sponge specimen, and on shore the negro hucksters pester the traveller's life with offerings of the staple commodity. Everywhere the sponge is as ubiquitous to the eye as it is potent in the local mart.

Side by side with the sponge industry, though of far less commercial moment, is the gathering of the conch. In the Bahama waters, at a depth of some fifteen feet, this

shell-fish, of old represented as the trumpet of the god Triton, breeds in great numbers, and, gathered by the colored divers, is sold regularly in the Nassau market for two cents each. The creature which inhabits the big-fluted shell, lined with its brilliant red enamel, is used for fish-bait, and more often for human food in the shape of very edible fritters. The shells, moreover, are exported for ornamenting garden plots, while the tinted lining is made into cameos. But most remarkable of all, perhaps one conch in a thousand carries within its soft body a pearl of great beauty, which commands an immense price. These conch pearls are round or oblong in shape, some of them as large as a pea and suffused with a wavy liquid color of pinkish hue, which changes beautifully as the light touches it at different angles. They have sold in Nassau for as much as two hundred dollars each, and in London have been known to bring a thousand dollars. So rare are they, and so well covered in the creature's body, that the search for them does not repay the labor; consequently many a pearl of great price has been thrown away, many broken in crushing the shell of the creature for bait, and not a few never discovered until they reach the table completely ruined by the heat of cooking. They tell at Nassau of an enterprising but unsuccessful Yankee who once tried the experiment of manufacturing these pearls, then inserting them in the flesh of the conch, and palming them off as genuine in the local market. To find one of these splendid gems is the hope and prayer of

the poor negro's life, as the discovery is not merely unwonted cash in pocket, but is a mighty symbol of good-luck. For, like his race everywhere, the Bahama negro is superstitious. He sees signs of portent in the markings of fish, in the colors of the waters, in the mutterings of the wind through the trees. A brackish and at night very phosphorescent pond not far from Nassau is his peculiar terror, and it is rarely after dark that one of the race can be found who will approach what he calls "de preposterous [phosphorescent] lake."

DOWN IN A COAL-MINE.

TO the traveller through Berks, Lancaster, and the adjacent farming counties of Eastern Pennslyvania no change can be more abrupt than that which brings him to the great anthracite coal region. At first come broad areas of beautiful farms cleared and tilled, until one can almost believe himself to be in the most highly-favored farming lands of England. Neat houses, so small, however, that the great Dutch barns seem to dwarf them to pigmies; rich orchards, filled with trees set in geometrical lines; velvety meadows, and furrowed planting grounds, all make up a pastoral picture to be rivalled probably by no other part of our country. Suddenly, as he travels northward, there comes a rude mutation. Mountains and steep cliffs, overhung with the chestnut or oak, succeed. The streams run black, and touch with their inky stain adjacent rock and tree. The sky is dim with smoke, the very air seems surcharged with soot, and the mountains, with their bright autumnal tints, or summer verdure, are scarred with dark rents or spotted with the great heaps of coal-dirt which commerce has left behind, a grim monument of her endless toil and aspiration for gain.

Of all the many and varied aspects of the coal industry and its home, none compares in picturesque quality with

these mountains of coal-dirt left by the army of miners as their long decades of subterranean toil proceed. For every ton of coal that has been extracted probably at least a ton and a half of slate or blackened dirt or rocky débris of some sort has been mined and discarded. A short distance away the heaps look exactly like the coal itself, and it is hard to disabuse one's self of the illusion that here has been wanton waste and loss. The heaps rise, sometimes far as the eye can scan, in every conceivable shape and dimension short of lofty mountains. There are long ranges, steep cliffs, valleys of black soil which the climbing dirt-cars are fast filling in. Sometimes the river which traverses a coal valley, swollen by rains, sweeps away thousands of tons of this coal-dirt, depositing it on low lands, where it spreads like a sea of pitch. In the Panther Valley, not far from Mauch Chunk, is a spot where one of these pitchy floods covering a lowland forest has risen half way up the tree trunks. The trees, their life crushed out by the overlying mass, project in stark and weird nakedness, over their inky bed, a wild spectacle of desolation. Experiment is still doing her best to utilize these dirt heaps, of which a large proportion is coal-dust. The recent novelty of pressing the better grades into bricks to be burned like the ordinary anthracite is said to be substantially a failure owing to the great expense. With certain kinds of engines driving a strong blast the dirt can be burned, but practically the consumption of it seems relegated to a remote period when either coal becomes

more costly or industrial processes more perfect than now. Many of these great coal heaps have taken fire by what is supposed to be spontaneous combustion. In that crisis it is hard work to extinguish them, and the fire very often extends so as to threaten the adjacent buildings and the upper woodwork of the shafts. To avert this danger, as well as to get additional room, the nucleus of a large heap is usually begun at some distance from the shaft. As the heap grows, an inclined railroad is run up its face, on which the cars of débris are pulled by steam, then run along a level and dumped, the level part of the railway being extended as the heap grows. The huge heap, when on fire within, burns without smoke, and, except under certain atmospheric conditions, it is hard to realize that the outwardly dull and opaque mass is a glowing Inferno within.

A mile or two from Pottsville is the chief coal shaft of that region, owned by the Philadelphia and Reading Coal and Iron Company, and named the Pottsville Shaft. Though opened only a few years ago, it is famous throughout this whole country for the completeness of its equipment, its extraordinary depth, and the knowledge it gives of the shape and direction of the coal strata below. The perpendicular depth of the shaft is 1,576 feet—the deepest coal-mine on this continent. From its vast depths, almost a third of a mile down, two hundred cars, holding about four tons each, are lifted each day. The cars are run upon a platform, and then the whole weight of six tons is hoisted at a speed that makes the head

swim. The time occupied in lifting a full car and at the same time letting down an empty one, through a distance of about one third of a mile, is a little more than a minute and a quarter. A few figures will show that the cars pass up and down at the rate of about a mile in four minutes, fifteen miles an hour, or, say, the ordinary velocity of a freight train on a surface track. Standing on one of the levels, eleven hundred feet down, the cars "snap" past, upward and downward, with a speed so great that the human eye scarcely sees them as they pass. The Belgian engine which does the lifting is a beautiful piece of mechanism, with its drum twenty feet in diameter, and its wire rope, which has a thickness of two inches, coiled around a centre of hemp that allows a nicer adjustment of the wires when stretched by use. The dramatic figure of the engine-room is the engineer, a man picked from his mates for his skill, his steadiness, and sobriety. Day after day throughout the year the fate of every miner hangs on his nerve and steadfast attention to duty. Monotony must not make him careless, the strain of responsibility must not weary him, his eye must be quick for the signals far down in the mine, his hand must be true to its cunning in "slowing up" and "starting," on each of which depends his costly machinery or, it may be, precious lives. Not often are the idea and ideal of duty more visibly incarnated than in this silent, thoughtful fellow, his hand on the lever, his restless eye on the signals or his machinery, and his whole life of

seemingly dull routine filled with care and accountability.

The State of Pennsylvania has carefully regulated by law the hoisting and lowering of men in coal-mines. Only a limited number—ten, I believe—can stand on the platform at once during its upward and downward journey; and a heavy fine is exacted when the law is violated. However, spite of every device of man, fatal accidents are not uncommon. Only a short time ago, in the Pottsville mine, the platform, when filled with miners, stuck in the shaft, and, the wire cable parting, left it hanging across the timbers hundreds of feet from the bottom. In this case, fortunately, all the men were rescued after a bad fright.

Go now to the shaft and peer over the edge. Below the vision may penetrate perhaps a hundred feet. The square shaft is divided into two parts, each lined with heavy beams—one half for the descending, the other for the ascending coal-cars. Only a little way down these beams begin to fade, then pass into ghosts of timber, then finally are lost to view in darkness. This darkness is so thick that it seems something solid and material, as though a stone dropped upon it would rebound with noise. Far down is a white speck just discernible, like a little star through a cloud. The speck is a miner's lamp, perhaps a quarter of a mile distant. Presently the platform comes in sight. The coal-car upon it is run off, and with your guide you step upon it, standing upright, with no chance for a brace or rest. It goes without com-

ment that people of lax nerves should never brave the ordeal of a descent in the Pottsville shaft. The machinery works as smoothly as that of the most improved of modern hotel elevators; but the speed is so terrific that one seems falling through air. The knees after a few seconds become weak and tremulous, the ears ring as the drums of those organs are forced inward by the air-pressure, and the eyelids shut involuntarily as the beams of the shaft seem to dash upward only a foot or two distant. As you leave the light of the upper day the transition to darkness is fantastic. The light does not pass into gloom in the same fashion as our day merges into night, but there is a kind of phosphorescent glow, gradually becoming dimmer and dimmer. Half way down you pass, with a roar and sudden crash, the ascending car; and at last, after what seems several minutes, but is only a fraction of that time, the platform begins to slow up, halts at a gate, and through it you step into a crowd of creatures with the outward shapes of men, but with the blackened faces, the glaring eyes, and wild physiognomies of unearthly fiends.

In a large mine like this there are often gangways for working the coal miles in length. They tell in the coal region of a single gangway running for seven miles underground, so that a miner can descend in the centre of one township and ascend near the centre of another. The gangways, which are always headed as nearly as possible along the coal-seams, are passages about ten feet wide and

eight feet high. Sometimes they are wet, sometimes quite dry. At times they are run through solid rock, but more often through loose rock or dirt, which has to be stayed by continuous joists of timber. A narrow-guage railroad takes the cars from the headings to the foot of the shaft. The motive power is the mule, an animal whose life in these mines reveals an almost human intelligence, if half the stories of the miners are to be relied on. Many of these coal-mules live for years in the deep blackness of the mine, apparently as healthy and strong as their brute brethren in the upper air. They are quick to scent the gas which betokens danger, and in case of an explosion rival the miners in seeking a point of safety. At the Pottsville shaft a story is current of one of these animals that drew with its teeth the bung from its water-cask so as to get a drink. In truth, the lot of these brutes is scarcely worse than that of the human toilers who work by their side, breathing in the vile coal-dust, half suffocated with the smoke of powder, and encountering constant peril from falling rocks and explosive gas. Bad as he looks, however, in the grime and soot of the gangway, the coal-miner is no worse than the ordinary mechanic of the upper regions. His cleanliness when not at his work is a marked trait, and, as a rule, he takes his bath as punctually as his dinner.

The trip for perhaps half a mile along one of the gangways to a "heading" where the coal is blasted out is

a strange and solemn journey. The little lamp set in your miner's hat barely suffices to make the outer circle of solid darkness visible. You tramp stolidly along between the railroad tracks in the thick coal-dust, which is like sand under the feet. Every now and then moving figures in the distance materialize into a train of coal cars, drawn by the ubiquitous mule, which crowd you close to the rocky wall as they pass. Now and then there comes a refreshing gush of air from a side gangway, but as a rule the atmosphere is dead, heavy, and sepulchral. As the end of the gangway is reached the air is wellnigh unbreathable. Powder-smoke and coal-dust enter the lungs, and it seems as though asphyxia were only a matter of moments. Close by the heading a human figure lies on its back. It is that of a boy not more than ten years old, who turns a fan that freshens just a trifle the air for the workmen twenty feet farther on. He and the other toilers must breathe for hours each day this fetid, dust-laden air, of which only a few moments' experience makes the visitor spit black phlegm for half an hour after leaving the shaft. At another point you pass a blackened miner cleaning thirty or forty lamps covered with wire screens. He says "Good-morning," and laughs cheerily when you joke him about using that supernal phrase in a habitation where the weather is so changeless. The guide explains that this is an important functionary whose office is as perilous as that of the "King's Taster" in old times. Every morning before the miners go to work he must explore all the

new nooks and crannies of the mines for the deadly gas. He knows the presence of the noxious vapor by the increased blaze of his Davy lamp, by the smell, and by the peculiar chill which is one of the qualities of the gas when it rushes out into the gangway.

The miners who labor seven or eight hours a day in this pit of horrors work usually by the car-load, and earn on an average not more than two dollars a day. Unhealthy as their toil must be, they have the advantage of a pretty equable temperature, which rarely varies more than ten degrees from the open air sixteen hundred feet upward. The intense heat at great depths, which we so often hear of in connection with the Comstock shafts and some English coal-mines, is, it must be remembered, a local and not a general phenomenon.

No visit to a coal-mine is complete without a sight of the breaker, whither the coal raised from the shaft is transferred to be broken up, the slate or other stones picked out, and the lumps sorted into the "pea," "nut," "stove," and other sizes in which it reaches our markets. The breaker is an immense building, a Chinese puzzle of architecture, filled with sets of revolving cylindrical screens, between the wires of which the coal crushed by hammers at the upper story falls out in various sizes. Below are huge bins, into which the coal drops, thence to be transferred by shutes to the railroad cars that pass through still farther below, in the basement of the breaker. But all the perfection of the breaker as a piece of commer-

cial mechanism is lost to the visitor in a sight which stirs his humanities to their profoundest depths. Opposite each of the screens sit three or four boys from seven to twelve years old, who pick out the slate from the coal as it slides by. The whole great breaker is almost hidden in its cloud of coal-dust, which seems thickest just at the place where these poor little fellows sit. Here, week after week, these sad children toil, breathing in the air that seems more than half dust, their stupid monotony of movement as they pick out the slate, their piteous eyes staring from the black grime that masks the face, and the dull despair that marks their whole bearing, all showing how steadily life and hope are being crushed out. If Dives, with ruddy-faced children round him, in the surfeit of home luxury, ever seeks a new incentive to charity, he need only glance into his bright coal fire, and reflect that, for its every flash, there is cast at the mine a shadow of childhood blasted and of young life shattered and wrecked.

THE BURIED FORESTS OF NEW JERSEY.

DRAW a straight line eastward from Philadelphia to the Atlantic Ocean and it cuts off to the southward about one third of the State of New Jersey with an area of some twenty-five hundred square miles. As a whole this part of the State is on its surface sterile and monotonous. On the east a wide marsh fringes the ocean cut by a system of salt-water sounds and by hundreds of tidal channels so intricate and mazy that only the old watermen know their ins and outs. The marsh rises westward into low timber lands succeeded by a long stretch of arid soil covered with brushwood and reaching seventy miles southward to Cape May. On the Delaware side the tract slants down into lowlands and swamps relieved only by the rich soils and neat farms of Salem County. Probably three fourths of the whole region is uncultivated, and even along the railroads the outlook is sombre and barren. But the harsh surface above has a redeeming quality below. In geological interest it is matched probably by no region this side of the Bad Lands of the Yellowstone. Its marl beds and its alluvial deposits generally teem with signs which mark immense changes of elevation, strata, or soil, and it is peculiarly rich in fossils, of both marine and land types. But none of the geological features are more

instructive and strange than the great cedar swamps of which the town of Dennisville, in Cape May County, is the centre and, in a commercial sense, the product.

The traveller to Dennisville leaves the cars and a crowd of gay Cape May pleasure-seekers at Woodbine, a little station on the West Jersey Railroad. A four-mile ride through dense underbrush, clouded by mosquitoes of vast penetration and blue-headed horse-flies as big as bumble-bees, will bring him to his journey's end. He will find Dennisville a sprawling, dingy township of three thousand inhabitants, with its central group of houses on a causeway between two great swamps. The wet lands around are covered partly by solid growths of white cedar, partly by thick water-weeds, and partly by stumps and fallen logs of immense size. These are only the surface indications of the wealth below. The swamps covering ten square miles are underlaid by sunken forests which grew hundreds and thousands of years ago. The seeming worse than barren wastes, for which the sharpest of Yankee farmers would deem fifty cents an acre a swindling price, have been worth by the acre their hundreds of dollars. They have turned their own desolation into a hive of industry, built up a lively village, and made an addition, as legitimate as it is unique, to the wealth of the country.

The huge trees which lie under the swamp to unknown depths are of the white-cedar variety, an evergreen, known scientifically as the *Cupressus Thyoides.* They grew years ago in the fresh water, which is necessary for

their sustenance, and when, in time, either by a subsidence of the land or a rise of the seas, the salt water reached them, they died in great numbers. But many of them, ere they died, fell over as living trees and were covered slowly by the deposits of muck and peat which fill the swamp. These trees that fell over by the roots, and known as "windfalls" to distinguish them from the "break-downs," are the ones most sought for commercial uses, and they are found and worked as follows: The log-digger enters the swamp with a sharpened iron rod. He probes in the soft soil until he strikes a tree, probably two or three feet below the surface. In a few minutes he finds the length of the trunk, how much still remains firm wood, and at what place the first knots, which will stop the straight "split" necessary for shingles, begin. Still using his prod like the divining-rod of a magician, he manages to secure a chip, and by the smell knows whether the tree is a windfall or break-down. Then he inserts in the mud a saw like that used by ice-cutters, and saws through the roots and muck until the log is reached. The top and roots are thus sawed off, a ditch dug over the tree, the trunk loosened, and soon the great stick, sometimes five or six feet thick, rises and floats on the water, which quickly fills the ditch almost to the surface. The log is next sawed into lengths two feet long, which are split by hand and worked into shingles as well as into staves used for pails and tubs. The wood has a coarse grain which splits as straight as an arrow. The shingles made from it

last for sixty to seventy years, are eagerly sought for by builders in Southern New Jersey, and command in the market a much higher price than the ordinary shingles made of pine or chestnut which last for roofing usually not more than twenty or twenty-five years. In color the wood of the white cedar is a delicate pink, and it has a strong flavor, resembling that of the red cedar used in making lead pencils. The trees once fairly buried under the swamp never become water-logged, as is shown by their floating in the ditches as soon as they are pried up, and, what is more singular, as soon as they rise they turn invariably with their under sides uppermost. These two facts are mysteries which science has thus far left so. The men who dig the logs up and split them earn their money. The work is hard, requiring, besides lusty manual labor, skill and experience, the swamps are soft and treacherous, no machinery can be used, and long stretches of mud and water must be covered with boughs or bark before the shingles can reach the village and civilization.

The number of the trees which lie below the surface of the ten square miles of swamp is almost countless. In many places the probe will be sunk many times before it fails to strike a log. As the workmen only dig for logs near the surface, and none but the best trees are selected, it is certain that only a small fraction of the logs have been exhumed since 1812, when the industry first sprang up. The sunken forests lie in all shapes. Sometimes the trees are found parallel, as though a wind blowing from

one quarter had felled them. But usually they lie pointing in every direction, and when, as occasionally happens, the wet soil sinks or dries, the mighty trunks are seen piled upon each other as in a Maine log-jam. What are seen, too, are but the uppermost strata of piles on piles unseen below. One or two evidences may be cited to show not only the great depth but the wide extension of the forest beyond the limits of the swamp. Down near the tide-waters of the Delaware, seven miles away, where no surface indications appear, a white-cedar log was found some years ago at the depth of twelve feet. At Cape May, twenty miles distant, the tools of workmen digging an artesian well were stopped twenty feet down by a big cedar log which, it was thought, would discolor and defile the water if the work proceeded. In 1873 the City Council of Cape May ordered that an artesian well should be dug to supply the city reservoir with water. At the depth of eighty-seven feet, after the tools had penetrated half a dozen strata of gravel, sand, or hard clay, an alluvial deposit was reached exactly like that in which lie the cedars at Dennisville. In it was struck a solid log, four feet in diameter, which was bored through, and specimens brought to the surface. In digging an artesian well at the Columbia House, Cape May, some years ago, pieces of well-preserved wood were found at the depth of ninety-two feet.

Perhaps the most remarkable of all the phenomena relating to the subterranean woods is the singular preserva-

tion of the logs, whose fibre is as clean and smooth as when their green tops, a hundred and fifty feet above the swamp, rustled in the breeze long eons ago. Doctor Maurice Beesley, for many years the patriarchal Galen of Dennisville, now gone to his reward, who made the sunken forests a special study, believed that the trees, as soon as they were covered by the soil of the swamps, became hermetically sealed, and that they will remain preserved as long as the world lasts and the swamp soil still surrounds them. If this theory be tested, however, it seems strange that wood placed at great depths in ordinary soils and covered closely from the air should not be similarly preserved. We have wooded swamps in New York State as soft and deep as those at Dennisville, but no sunken forests. It seems more credible that there is some subtle and unknown quality, either of the amber-colored water of the Dennisville swamps or of the peculiar alluvial deposit, which accounts for the phenomenon. It is a well-known fact also that in certain peat formations of Ireland human bodies can be preserved for many years without losing their rotundity and freshness. Perhaps the analogy applies to the big archaic trees of Dennisville.

The age of the sunken trees opens a long and obscure vista for research. The age of a single tree is readily found by counting its rings. Doctor Beesley thus counted ten hundred and eighty rings of a white-cedar stump, representing an age of the same number of years. But this

stump was only five feet in diameter, while some of the trees have a diameter of seven feet. The rings near the centre are perhaps three eighths of an inch apart, while toward the circumference they are so crowded that they must be counted with the microscope; so that the ratio of seven to five cannot be used to find the longevity of a seven-foot cedar which probably lived some two thousand years before it fell. The absolute age of the underground logs—that is, the time that has elapsed since they sprouted—is ascertained only by approximations. Doctor Beesley, however, made some valuable and suggestive investigations of the subject. In one case he found a tree six feet through and about the same number of feet underground. This trunk was accidentally discovered by workmen who had exhumed a smaller log above it. On top of the great log was found a large underground stump five feet in diameter, and a smaller stump was superimposed on the larger one. As the tree of the larger stump could not have begun to grow before the large tree-trunk fell, and the upper stump belonged to a tree that germinated on the stump underneath, by counting the rings of the stumps—or the rings of trees of the same size—and also the rings of the underlying tree, the minimum age of the latter was ascertained. It was twenty-one hundred and fifty years. But counting the age of the overlying soil, and also of a covered tree which lay over the upper stump, the doctor concluded that the big tree underneath all had germinated thirty-one hundred and fifty years ago.

Another test the doctor applied in the following manner: He found half covered in a cedar swamp a log with the ends cut, evidently by human hands. It was found that the log had been cut for an adjacent saw-mill which was running about one hundred years ago. Old citizens of Dennisville whose memory retraced seventy years of time could recall no period when the locality of the cut log had been worked either for living or sunken timber. The inference, then, was just that the log had been cut for the old saw-mill and was at least one hundred years old. Four inches of peaty soil had accumulated up the sides of the log. Here then was a unit by which the rate of accumulation of soil over the big trees could be measured. Each four inches represented a century's growth of the alluvial mud. The bottom of the big tree under the stumps was twelve feet beneath the surface of the ground. By dividing twelve feet or one hundred and forty-four inches by four we get thirty-six hundred years as the time since the trunk fell over, and a thousand years or more must be added to represent the time since it sprouted from its little seed, which was about one quarter the size of a buckshot, or, say, one eighth of an inch in diameter. Of course all calculations of the foregoing kind are rough and inexact, In the case of the tree cited the accumulation of débris a thousand years ago might have been more or less rapid than now, nor can the interval that elapsed between the growths of the stumps and the tree be estimated. But the computation of forty-six hundred years

for the old tree is probably far below rather than above the truth.

The time is within the easy memory of living man when the Dennisville swamps were covered with growing timber as large as that which now lies below. An old citizen of Cape May, who worked thirty years ago in the swamps, remembers felling a tree so large that standing by its side he could barely look over its upper edge. Upon its trunk he counted about eleven hundred rings of annular growth. What a king among our eastern woods was this great cedar! Let us take a suggestion of the poet Holmes, and imagine a strip an inch or two wide cut from its circumference to the centre. What a chronicle of more than a thousand years of mortal vicissitudes, of gory campaigns, of shifting dynasties, of ebb and flow of national life, could be marked on the arcs of that narrow yardstick! A single pencil dot on the microscopic lines, near the outer edge, would stand for our war of 1812. An overlapping mark, perhaps a quarter of an inch long, would span the career of Napoleon from Toulon to Waterloo. Move a hundred years nearer the centre; another short line covers the reigns of Louis the Fourteenth of France, of William and Mary, of Queen Anne and the triumphant campaigns of Marlborough. The great tree was two thirds grown when Luther was summoned to the Diet of Worms, and when Columbus, twenty-nine years before, reached our continent. It was a stalwart trunk when William the Conqueror fought at Hastings, and it was a lusty sapling

when Charlemagne renewed the Holy Roman Empire. If we call this tree old what shall we say of its ancestors a few feet down, whose circles include the rise and fall of Rome, the coming of the Saviour, the splendor of Athens, the luxury of Persia and Babylon; nay, perhaps, even that period of the Scriptural patriarchs which lies on the shadowy edge of human history? Yet even these trees are young in comparison with the sylvan monarchs ninety feet below the ground at Cape May, under strata, which, in turn, are but a film of the earth's crust and a yesterday of the world's geological past.

PETROLIA AND ITS MARVELS.

THE unequivocally oily city of Bradford, born and bred in petroleum, is but little more than three hundred miles from New York, and may be reached in a journey of twenty hours by rail; yet it is singular how, as soon as one enters it, he feels as if he had come to a new and crude zone of American civilization. The spirit with which one first views the rough novelties of a Pacific mining town is kept alive in Bradford at every step. There are the rough men, counterparts of the miners, reckless of personal appearance, who have each made or missed an oily fortune half a dozen times. There are the speculators, careworn, troubled men who, in these times when the market chills rapidly to zero or rises with fever pulse, scarcely know from day to day whether to count themselves millionaires or paupers. Then, too, the sprawling city, with its hybrid make-up of solid brick, tacked on to rough board dwellings, strengthens the impression of mushroom growth. Indeed, on the present site of Bradford in 1877 was a population of only three hundred souls, where ten thousand live now. The lands, which have since sold for a thousand dollars an acre and a royalty of one quarter the gross production of oil, were then begging a sale at three or four dollars an acre. Where then

stood a little telegraph shanty, doing for the scattered lumbermen a business of five dollars a month, are now a dozen offices which take in sometimes for messages as much as two thousand dollars a day. Finally, what adds more than all else to the sensation of novelty and remoteness is the ubiquitous derrick. Even as an isolated fact a derrick has a gaunt and phantom individuality of its own. But make the derrick omnipresent; place derricks, sixty feet high, by the dozen, in vacant lots, in gardens, on the street corners, in back yards; perch them on rugged hill-sides amid the stumps of the trees their structure has absorbed; crown mountain tops with them; fill long vistas of landscape with their skeleton outlines,—under these conditions the derrick, if not a novelty singly, becomes collectively sufficient to change the whole face of civilization.

But Bradford does not have to be reached before one finds out the oily newness of things. Thirty or forty miles away the huge tanks of the United Pipe Lines begin to fill up the level fields, squatting sometimes over whole square miles of area. The air is scented with petroleum, the water one drinks smacks of the same aromatic fluid, the tank-cars on the railroads multiply, and the talk of the male passengers turns on oil prices, oil wells, "pumps," flowage, and waste. Travelling down the Tuna Valley, and nearing Bradford, the horizon at night is luminous with the flashing masses of flame from burning gas at the wells, which brighten the hill-sides like great

bonfires. The city itself is lighted by this gas, burned just as it comes from the wells, without any purifying process. Householders pay to the local company fifty cents a month for each gas-burner, and are at liberty to use it night and day. Hotels and other establishments consuming the gas in quantity get it at a much cheaper rate. It is also very largely utilized in heating, at a price of about three dollars a month for each gas-stove. It goes without saying that under these conditions consumption is most reckless. Street lamps are lighted at mid-day; half the shops, though closed to customers, are brilliant the night through, and gas is treated with the same noble contempt for economy which is felt for air or water. This crude gas, however, burns with a vulgar, yellowish light, as well as very unsteadily.

A matter of absorbing but still unsatisfied curiosity is the origin of this petroleum or "rock oil," gushing up from a thousand or more feet below the surface, and filling so large a place in our commerce and industry. Science, on many points so precise and positive, gives us here two divergent theories. By one hypothesis it is contended that the porous sand-rock which underlies the oil regions, on an average about a fifth of a mile below the surface, is the original source of the oil deposit. In these sand-rock strata, so it is said, formed from beds and shoals of rivers, there were ages ago deposited vast masses of vegetation. These, under certain conditions, produced coal which in its chemical constituents much resembles oil; but under

conditions a little varied they produce oil or "liquid coal," which, with gas, is held suspended in the spongy stone, and now and then gathers in cavernous magazines, where it is held fast under the immense pressure which, when relaxed by the oil-digger's drill, drives the fluid to the surface in a jet of oil and gas. A second theory asserts that the oil is not generated in the sand-rock measures, but in the carboniferous shales far below. Here there is developed by heat a gas which, forcing its way upward through rocky fissures, reaches the colder sand-rock strata, where it is condensed into oil, and this oil is held down under the harder upper crust of sand-rock until the drill gives it exit. This last is the hypothesis most generally accepted by scientists of present fame. Whatever the origin of petroleum, there can be no doubt of the magnitude of those operations of Nature which—scientifically rather than commercially speaking—have been going on over an area of some four thousand square miles in Pennsylvania alone, which have led to the sinking of some thirty thousand wells, costing on an average at least twenty-five hundred dollars each, or seventy-five million dollars altogether, and which have been so wantonly abused by the improvidence of man that the shadows which portend the failure of our coal-oil supply have already begun to fall.

The crude petroleum, as it issues from the Bradford wells, might very readily be mistaken for dirty water. It is yellow in tint, takes fire like other oils, foams easily

when agitated, and seems more viscid and less strong in smell than the lower grades of the refined article. If the reader will take a small vial, fill it with water, add a little sweet oil and yellow dirt, then shake up the compound vigorously, he will have—barring the smell—a pretty good likeness of the crude rock-oil of the Bradford region. In refining about one quarter of the crude petroleum passes away, largely into more solid products, which are so far utilized now that petroleum may be regarded as a complex product with every part valuable. Few people appreciate its place in our export trade. In the fiscal year ending in 1881 we shipped to foreign countries petroleum and petroleum products worth $40,315,000. It ranks third in our export trade, following breadstuffs and cotton, and the exports represent only a fraction of the whole product. In this connection it may be said that, according to trustworthy estimates in Bradford, the Standard oil monopoly which controls the oil trade can produce refined petroleum at five cents a gallon. Householders, therefore, can estimate for themselves, from the local prices they pay to their grocers, the intermediate costs and profits. At Bradford the best refined petroleum sells at ten cents a gallon.

The machinery used in boring one of the deep oil wells, while simple enough in itself, requires nice adjustment and skill in operating. First comes the derrick, sixty feet high, crowned by a massive pulley. The derrick is a most essential part of the mechanism, and its shape and height are needed in handling the long rods, piping, casing, and

other fittings, which have to be inserted perpendicularly. The borer or drill used is not much different from the ordinary hand-drill of the stone-cutters, and the blade is in shape exactly the same. But it is of massive size, three or four inches across, about four feet long, and weighing from one hundred to two hundred pounds. A long solid rod, some thirty feet long, three inches in diameter, and called the "stem," is screwed on the drill. This stem weighs almost a ton, and its weight is the hammer relied on for driving the drill through dirt and rock. Next come the "jars," two long loose links of hardened iron playing along each other about a foot. The object of the jars is to raise the drill with a shock, so as to detach it when so tightly fixed that a steady pull would break the machinery. The upper of the two jars is solidly welded to another long rod called the sinker-bar, to the upper end of which, in turn, is attached the rope leading up to the derrick pulley, and thence to a stationary steam-engine. In boring, the stem and drill are raised a foot or two, dropped, then raised with a shock by the jars, and the operation repeated. If I may hazard a further illustration of the internal boring machinery of the well, let the reader link loosely together the thumbs and forefingers of his two hands, then bring his forearms into a straight line. Conceiving this line to be a perpendicular one, the point of one elbow would represent the drill-blade, the adjacent forearm and hand the stem, the linked fingers the jars, and the other hand and forearm the sinker-bar, with the derrick-cord attached

at a point represented by the second elbow. By remembering the immense and concentrated weight of the upright drill and stem, the tremendous force of even a short fall may be conceived. The drill will bore many feet in a single day through solid rock, and a few hours sometimes suffice to force it fifty feet through dirt or gravel. When the débris accumulates too thickly around the drill, the latter is drawn up rapidly. The débris has previously been reduced to mud by keeping the drill surrounded by water. A sand-pump, not unlike an ordinary syringe, is then let down, the mud sucked up, and then the drill sent down to begin its pounding anew. Great deftness and experience are needed to work the drill without breaking the jars or connected machinery, and, in case of accident, there are grapples, hooks, knives, and other devices without number, to be used in recovering lost drills, cutting the rope, and other emergencies, the briefest possible explanation of which would be too long for the reader's pleasure.

The exciting moment in boring a well comes when the drill is penetrating the upper covering of sand-rock which overlies the oil. The force with which the compressed gas and petroleum rush upward surpasses conception. Drill, jars, and sinker-bar are sometimes shot out along with débris, oil, and hissing gas. Sometimes this gas and oil take fire, and, in the summer of 1882, one of the wells thus ignited burned so fiercely that a number of days elapsed before the flames could be extinguished. More often the tankage provided is insufficient, and thousands

of barrels escape. Two or three years ago, at the height of the oil production of the Bradford region, eight thousand barrels a day were thus running to waste. But those halcyon days of Bradford have gone forever. Although nineteen twentieths of the wells sunk in this region "struck" oil and flowed freely, most of them now flow sluggishly or have to be "pumped" two or three times a week.

"Piping" and "casing," terms substantially identical, and meaning the lining of the well with iron pipe several inches in interior diameter, supplement the labor of boring. The well, if a good-flowing one, does all the rest of the work itself, forcing the fluid into the local tanks, whence it is distributed into the tanks of the pipe-line companies, and is carried from them to the refineries. The pipe lines now reach from the oil regions to the seaboard, carrying the petroleum over hill and valley, hundreds of miles to tide-water.

The elements which for years have made the oil trade a synonym of speculation are easily understood. Enormous variations in supply, the discovery of new fields, the sudden exhaustion of productive wells, "corners," monopolies, and all sorts of combinations have made a vast gambling game of the whole business. Volumes could be written about its ups and downs, and their sequels of sudden wealth or poverty. At this time of writing, crude oil is selling at the tanks for one dollar and ten cents for a barrel of forty-two gallons. A few days ago it reached

one dollar and thirty-five cents a barrel, and a month or two before it was down to fifty cents. It fell in one day thirty-five cents a barrel at Bradford, and, to use a local phrase in describing that tumble, "big operators broke like pipe-stems." With fluctuations so enormous and swift, all sober commercial sagacity seems set at naught. Speculation, too, seems to make the meat it feeds on. Since a recent rise in oil, and within a few weeks, eight new oil exchanges have been organized in Northwestern Pennsylvania and Western New York, though at the beginning of the year there were but five altogether in the whole country. Some of the local hazards of the business and their outcome are simply ludicrous in the light of rational business venture. Overlooking Bradford is a precipitous hill, or rather mountain, some eight hundred feet high. On its crest is a well and derrick. "That well," said a citizen of Bradford, speaking of oil speculation, "was located in New York City on a map which the projectors supposed represented level ground near Bradford. Instead of going down a thousand feet, the drill had to bore eighteen hundred before reaching oil-rock. Yet the well proved a good one, and the owners blundered into a first-rate thing."

More romantic as well as more adventurous phases of speculation are connected with the labors of the persons known locally as "oil scouts." The oil scout is a spy kept to watch the movements of prospectors who put down what are called the test or, in more slang phrase,

"wild-cat" wells in new and undeveloped districts. Though most of these test wells are costly failures, yet when oil is struck in a new region, and the secret can be kept, a great fortune is certain to follow. The discoverer can "sell short," or he can buy up the surrounding lands and lease or sell them at a profit, as well as avail himself of the direct product of his new-found well. His chief foes are the scouts, one of whom is employed by almost every large oil speculator to keep him posted on "wild-cat" discoveries. The work of the scout is arduous and uncomfortable. He must lurk around the derrick night and day—now hiding behind trees, now crawling to the derrick through grass, always watchful for a shot from the gun of the derrick guard. He must know how to ply a reckless workman with liquor or money, and have a keen nostril for the new-found oil or gas escaping from the well. His is only one of the many strange types of mankind to be found in this fantastic region of speculation and risk.

A YANKEE TOWN-MEETING.

TO-DAY, the second of October, eighteen hundred and eighty-two, has been town-meeting day in the old Yankee town of Litchfield—a day marked for its own sake by a red letter in the yearly cycle of a Connecticut community, and, besides, not devoid of a certain historical dignity. For Connecticut, unlike most of our American States, was built up from its towns. From the first townships new ones were colonized, and, as these made up a large enough cluster, the Commonwealth at last was organized. So, historically, the Connecticut town was the fundamental unit of the body politic—each governing itself, and its administration representing the only pure democracy since the Athenian era. Coming down to us from this illustrious origin, it is not singular that "town-meeting day," the first Monday in October, from time immemorial, has held fast its place in the habits and traditions of our Yankee communities. Its features and incidents are still substantially unchanged since the days of our fathers; even the State election, which the iconoclastic rulers of Connecticut have placed only a month later than town-meeting, has failed to absorb it; and it promises fair to be for a long time what it is now, a day when the farmer, his harvest over, seeks with his boys a

holiday, over which the duty of the citizen flings at best a flimsy mantle of sanctity and excuse.

Here in Litchfield, an old town with a people mainly agricultural, the town-meeting preserves peculiarly its old elements and traits. It comes, too, just after most of the city visitors have departed, and by its own primitiveness emphasizes a pleasing contrast. For the old village, in the centre of the township, has changed—shall we say degenerated?—sadly from the old time. City airs, city manners, city exactions and affectations have usurped the place of that old simplicity and quiet culture which were once the qualities of the community. Urban pedantry even gives the houses names of the stilted "Maplewood" and "Fairview" type. The sewing society of the old time has been supplanted by receptions at four o'clock in the afternoon, resplendent with the latest triumphs of the French *modiste;* dog-carts with horses driven tandem and panoplied like mediæval steeds bump their owners up and down along the streets, satirizing comfort with fashion's latest folly; and downy young men of rich dress and tender brawn affect more the vices of the city than sturdy rural virtues. To all this mass of vanity and nonsense town-meeting day comes as a refreshing country breeze strikes a superheated city. The old court-house, at least that lower story of it that embraces the town-hall, is flung open; the ballot-boxes, plain, unvarnished mementoes of many a bitter local strife, are arranged in line behind the much-dented parody of a desk; the ancient bell, which

summoned our fathers to the duty of citizenship, dings out a lively peal; and one by one the bucolic freemen gather, less impressed, to all visible aspects, with the responsibilities of the day than with the chance it gives them to meet neighbors, talk crops, or drive a bargain. They come to town-meeting a good deal as they go to church, only here are parties instead of sects, with no text, no sermon, and not much religion.

For one who sixteen years ago was familiar with almost every voter in town, there is no more impressive signal of passing time than a revisit to the polls on "town-meetin'" day. Sixteen years work a vast change in a Yankee constituency of voters. Boys in skirts, heaping up their mud-pies, have grown to be electors; stalwart men of middle age have lapsed into decrepitude, and half a generation of freemen have gone over to that Great Majority which political parties can neither make nor unmake. Watch the string of voters as it passes before the boxes. A form bowed with age you recall by some familiar movement as once a Hercules of the fields most famous for "liftin' the biggest stun" among all the farmers of the township. A young voter, bearded, browned, and sturdy, is next in line. He is a stranger to your eye, but as the checker calls his name you remember him as a youngster fishing for minnows, with one suspender, an alder pole and a fishhook big enough to catch a shark. Next comes a figure prematurely old, with dulled eye and shabby coat. Twenty years ago he was the head boy of the Sunday-

school, later a leader of the village youth when any mischief was brewing. But self-indulgence came, ripened into vice, and his life is a wreck. So the string of voters moves on. Some few are familiar, but most of them are unknown or recognized only by the family name and feature; but on all who are remembered time has stamped his unerring mark. One can but notice, too, how few, comparatively, in number are the young men, so many of whom, representing the vigor and ambition of agricultural New England, have joined the endless procession that moves from our Yankee farms to the growing West.

No town-meeting in a New England community of any size would be complete without its auction. At no other time of the year can the truck of farm and household be sold to so large and varied a set of patrons. Some farmer moving away, a bankrupt householder, or a merchant "selling out," supplies the stock in trade; and words are feeble to describe the medley of second-hand goods dumped out before the Litchfield court-house. Everything is there, from a broken sewing-machine down to a rusty chain or a nicked axe old enough to have figured in the familiar legend of Washington's boyhood. Over all this conglomerate of truck stands the auctioneer, a predominating figure at Litchfield town-meetings long to be remembered, and now, at seventy-seven, so old as to be a social landmark of the village. Tall and angular, with spectacled nose like the beak of a Roman galley set on

the face of a Socrates, a voice like that of the Numidian lion, a ready tongue, and a wit whose Attic salt time has not even yet freshened, he does more to enliven a Litchfield town-meeting than all other characters united. Consistent piety, kindly and generous temper, and a simple, unaffected life round off the personality of a man who more than all the rest seems to me to symbolize the spirit of those town-meetings at which he has been auctioneer for time out of mind. Good old Tom Saltonstall! Long may he live to knock down to the highest bidder the archaic kettle and prismatic-hued bedquilt; and at that Great Town-Meeting where we shall all gather when time and eternity meet, may no figure more sinister than his be there to bid us welcome.

No form so effectively as old Tom's sweeps memory back twenty years to the boyish pranks that used to make election-day a carnival of mischief for the youth of Litchfield. The crowd he gathered at the auction in front of the court-house always tempted us to some half-lawless trickery. In those times, and up to two or three years ago, the State election came on the first Monday in April, and the voters not uncommonly came to the polls in sleighs over a hasty-pudding compound of mud and dirty snow. When a fall of snow became moist under an election-day sun, so as to pack easily into balls, the heart of every true Litchfield lad thumped with delight. Then half a dozen of the most agile of us would "shin" up the lightning-rod to the belfry forty or fifty feet above, and,

secure in our perch, pelt mercilessly the helpless and somewhat profane crowd of sovereign voters clustered about Tom below. It is hard, even now, without a smile, to remember that band of lawless youngsters entrenched over the court-room once graced by an Ellsworth, a Gould, and a Reeve, and, like some more modern rogues, finding protection for our iniquity under the very ægis of justice. Some of us, now grown, let us hope, into more law-abiding citizens, may recall one of the exciting episodes of that roguery—how the grim curator of the old court-house attacked us through the skylight, deeming he had cut off our line of retreat, and how with disappointment he stood aghast as the expected victims slid down the lightning-rod to solid ground; how then we devised a new scheme of attack, and a dozen boys, going behind the court-house, made each a heap of snowballs like a miniature pyramid of cannon-shot. A few balls fired over the temple of justice gave us the range, and at a given signal the bombardment of Tom's crowd began; each boy using up his heap as fast as possible, then making a sort of Bull Run retreat to an adjacent system of barns and cow-sheds. How we laughed when we pictured the dismay of the sturdy electors at the rain of snowballs coming from an unseen foe, and how slyly we gave one another the wink when, a few minutes after, we met in the same crowd with faces as smug and innocent as cradled babes.

To some of us of an earlier day town-meeting was a luminous epoch of the year that changed an impecunious

lad into a bloated capitalist. For on that day we received a stipend of an old-fashioned ninepence, and Vanderbilt never contemplated his millions with a bigger sense of money potency than was ours as we marched down-town with what seemed a nation's wealth in our vest pockets. Money then, as in later years, brought its responsibility, for the youthful brain was racked between sacrificing the ninepence at one swoop for a bowl of oysters, or subdividing its purchase power into small beer and sundry cakes or candy. No Peel or Gladstone ever labored over a national budget more than did we over this fiscal problem. The oysters sold in an open tent usually carried the day, for they came up fresh from "Dragon," as Fair Haven, then the entrepôt of Connecticut's oyster trade, used to be called; and besides, we had a trick of swallowing the crackers or broth first, and begging a fresh supply of one or both. What later feast at Delmonico's, or triumph of Gallic cookery, has ever equalled those bowls of Dragon oysters in the days when the youthful maw was insatiable, and appetite was sharpened by the keen autumnal air?

In a small way, but how curiously, rural character is revealed by the simple act of voting. One elector, proud of his party fealty, walks up with every ballot displayed to view. Another sneaks in his ballot as he would lift a chicken from the nocturnal roost of a neighbor. Fun, austerity, responsibility, all points of character crop out in the exercise of the freeman's right. A different and

more amusing field for study is opened by the garbs of the voters in every phase from looped raggedness to broadcloth. Town-meeting day comes at just about the time of the year when the straw hat of the backwoodsman has survived its summer beauty, if not its usefulness. What a varied aspect its faded, dirty, broad-brimmed, ragged-edged individuality has! Now turned down in front and elevated behind, or *vice versâ;* now slanted forward on the forehead, anon perched at a forty-five-degree angle on the cerebellum; sometimes with the whole broad circular brim uplifted, sometimes depressed until it looks like a serrated pot-lid, color and all. Some of the costumes which come in once a year from the back districts would alone make the fortune of a character actor, with their Gothic cut and literally matchless patchwork of color. It seems almost as if one could mark off the generations of the owner's family by the seams of his pantaloons. On one occasion, years ago, I remember a voter who came in to a Litchfield election from a region appropriately named Hardscrabble. He had on a complete suit roughly sewn together from coffee-bags, of a cut and finish utterly indescribable. A pair of pantaloons worn in by an Irishman at the presidential polling day of 1856, are also fixed indelibly in memory. They were of tawny hue, and between black concentric circles the motto "Buck. and Breck." emphasized the wearer's Presidential preference. Years afterward, when fishing along a trout-stream, I saw the same dense integuments, and on the same owner.

Doubtless those political trousers survive to this day, though, it may be, partitioned so as to fit the young understandings of a later Hibernian generation.

At two o'clock comes the open meeting for the election by *viva-voce* vote of some petty town-officers. A clerk is chosen, and the moderator behind the boxes—to-day an old church deacon, chosen for his fairness and non-partisanship—rattles off the nominations, which are ratified by a vote of about one each. Five minutes after this formal business was ended, and after the moderator in stentorian voice had announced, "Gentlemen, proceed with your voting," the clerk discovered that the open meeting had chosen no haywards, three of whom figure annually on Litchfield's dignified list of town-officers. Without the formality of reopening the meeting, three haywards were nominated and elected in a trice. The hayward is a Yankee official, charged with the grave function of driving stray cattle to pound at a fee of fifty cents each. As kine do not get astray in Litchfield streets half a dozen times a year, and are rarely impounded when they do, the office of hayward will scarcely become the prey of vaulting politicians. Speaking of the moderator, it was delightful to see how, to-day, his Yankee pluck and common-sense solved the questions which arose as to the right of electors to vote. In one case, after an adverse decision, a vociferous village lawyer attempted to browbeat him, saying: "Mr. Moderator, for three years you have decided this question the other way." "All right," was the

response; "if I have decided the question for three years wrong the other way, all the more reason why I should decide it right now."

The informality and even carelessness of the voting at a New England town-meeting would delight the ward politician of the city. In one instance a red-headed voter marched up to the polls. His name was called, and before it had been checked his vote was in the boxes, which, by the way, have holes big enough to thrust in one's fist. Then it was found that the voter's name was not on the check-list at all, and that his residence in the town had not qualified him to vote. However, his vote was in, and the Supreme Court of Connecticut could n't get it out. There was blank consternation for a moment, but finally the irregularity was compounded by a general and good-humored laugh. So, too, after the count of the ballots had proceeded for an hour—in a kind of wooden cage set in the corner of the hall, and doubtless from patriotic zeal painted red, white, and blue—it was remembered that the check-book was needed to verify the vote. The check-book had been left outside, and half the freemen in the room had scanned it, with every chance, had they desired, to check off fifty additional names.

Race and hereditary influences in voting crop out vividly in a Yankee town-meeting. There are a hundred or so Irish voters in Litchfield, and probably every one of them to-day not only voted the Democratic ticket, but affirmatively on the more momentous local "issue" of licensing

the retail liquor traffic. Far more suggestive was it, however, to see how powerful is hereditary example in Yankee politics, and how invariably to-day every son followed the political leadership of the father. Put race and congenital influence together, and they offer a sad commentary on voting independence. Here was an intelligent Yankee town, with a well-educated constituency who read the papers and scan passing events. Yet in it, as in every other American community, the party line was drawn not by reflection, sober judgment, and independence, but by the merest accident of birth and association. How many men cast a thinking vote? is a blunt query which, after seeing a Yankee town-meeting, addresses itself with peculiar force to every man unfettered by the links of party.

ON BLACK ICE.

LATE in November, when the sun, even at noon, hangs low on the southern horizon, and the short days pass swiftly into long and freezing nights, there comes on the ponds and rivers of New England the first ice of the year, usually, in rural phrase, called "black ice." The term will no doubt mystify most city folk, whose ignorance is dense of those many and picturesque forms that ice in the country puts on, from its first appearance in late autumn until its melting moods of spring. To the habitual city resident these wondrous changes are as a sealed book of mystery. He only knows of ice as a dripping, half-disintegrated, semi-opaque mass of matter, tumbled out each morning on the pavement from lumbering carts—a thing essential in cooling drinks, and figuring with unerring certainty in the bill of household expenses. Even the city skater who visits that yeasty, snowy compound called ice, at Central Park, and bumps about in the rough sea of humankind, never discovers what real ice is. To that artificial city product, the early black ice in the country is as blue sky to a fog-bank, or as the clearest of mountain streams to the turbid current that drifts along the drain of a metropolitan purlieu.

There is something almost poetic in that transforma-

tion which comes on the surface of a clear mountain pond at the first touch of Jack Frost in the latter days of November. The cold nights which skim the puddles and smaller areas of water leave for some days the larger ponds unfrozen, or skirt their edges with a little scalloped fringe of icy needles. Then comes a night more biting than the rest, followed, it may be, by a lusty "cold snap"; day following day with blue sky, and with that tense dry quality in the cutting air which can almost be seen as well as felt in the tingling finger-ends. Visit at this time the mountain lake and see what has happened. A few rods away it seems just what it was before. There is the same deep blackness of water outside of the lines of reflected sunlight, the same slanting rays of silver where the sunlight falls. But the breezes do not ruffle it, the tree-shadows are pictured on it less vividly, and its placid, changeless surface appears to mock every movement of nature around it. Step out on this mysterious sheet of crystal without fear, for though not more than an inch and a half thick it will bear you up without a crack. It takes a species of faith to make this first advance, for it seems almost as though one were walking into water. But the surface, instead of giving way, is firm as marble underfoot. You are borne up as by some invisible power, and held in suspension between air and water. I can conceive of no feeling, for one who experiences it for the first time, more exhilarating than the initial steps on the black ice of clear country waters. It is not ice on which one seems to

tread, but calm, solid water, and the bottom below, with weed, rock, sandy slope, or matted limbs, is as distinctly outlined as though in the air above.

This black ice formed at the first freezing contrasts strikingly with the later snow-ice, not only in appearance but other qualities. The axe which at one blow may sink almost to the helve in snow-ice can be struck into the black surface not more than an inch or an inch and a half at a stroke. The black ice splinters into bits under the blow like brittle flint, while the snow-ice crumbles or splits into large fragments. Taken in the hand and examined more critically, the black ice reveals many points of beauty and interest. That dark aspect when resting on water which gives it its local name is exchanged for a purity like crystal. Instead of air bubbles, it contains a few *spiculæ*, fine as cambric needles and as straight and smooth as the column of mercury in a delicate thermometer. The specific gravity of black ice must be very high. I have seen a floating cake two inches thick which showed a mere film above the water surface. The men of science tell us that the Arctic icebergs have from seven eighths to eight ninths of their mass under water. If one of these bergs could be changed to black ice and dropped in fresh water, at least nineteen twentieths of its bulk would probably be submerged. The strength of this solid new ice in comparison with the weaker varieties is prodigious. German military authority is quoted as declaring that on a thickness of four inches a regiment of men can cross without breaking

ranks. It bends like rubber before it will break, and it takes a warm sun to melt even a film of its surface. I recall from boyhood a striking proof of the elasticity of black ice. In one of the towns of Northwest Connecticut, between two lakes, stretches a long reach of level bogland which a winter's thaw often covers with water. Years ago one of these periodical overflows covered the bogs, and a sharp snap of cold weather left a level surface of black ice several inches thick. Then the water receded, leaving the ice hung on the bogs, but bent between them into a series of long depressions like the troughs of Atlantic waves. The sensation of skating over these long billows of ice was peculiarly novel, and for days the lads of the near village indulged in it with irrepressible delight.

The beauty and variety of the vegetable forms that flourish at the bottom of a country pond in winter are wonderful. A common popular fallacy attributes to water-plants that same decay and wintry death which blights leaf and blossom in the open air. This is sweepingly true only of the water vegetation which reaches to the surface. Below, in shallow waters and on muddy bottoms, plant-life is for the most part not only perennially green, but abundant. Even the great lilypads appear to keep their verdure far into the winter, and tangled masses of a plant that looks like subaqueous chickweed are as fresh and green as the garden growths of June. It is a strangely fascinating sight one sees either when skating over shallows or lying down and gazing through the clear ice at

nature's watery conservatory. In the shallows the plants are twisted together in a wild water-jungle of weeds, some blackened by the cold, others in every shade of green, but all running down to a thick, verdant carpet of hair-like grasses that lines the bottom. As the water deepens the larger vegetation disappears, but the grassy carpet remains, a zone of greenery between the shallows and the deeper waters of the pond. Then comes, perhaps, a mud bottom, too deep for water-plants, but not too far down for the eye to see it; then a stretch of white sand, rocks between which minnows dart, an old tree-trunk, or a shoal of sunken leaves, until finally the bottom drops away, and vision is lost in an impenetrable gloom of water.

Even more striking than the diversity of plant-life is the marvellous range of insect-existence to be found in the winter weeds of our rural ponds. Cut a small hole through the ice, and the familiar phenomenon of a sunbeam passing through the dust of a room is repeated. Like the sunbeam this watery ray is filled with motes, and a closer view shows them to be darting organisms so small that only movement can be distinguished. The most curious of the many creatures of large size that live in the weeds is one that can probably be found by thousands in the winter vegetation of almost any New England pond. It is a larva about an inch in length, and twice the diameter of a match, fitted on the body with hair-like appendages, and near the head with a lively set of organs which seem partly legs, partly feelers. This

strange creature lives like a human being, in a wooden house. You see what seems to be a hollow twig two or three inches long lying quietly on the bottom. Presently the twig begins to stir. Then there protrude a head and feelers with which the singular fellow begins to climb from one blade of water-grass to another, dragging painfully after him his wooden habitation held by his tail within. The relation in size between the two is about that of a common house-fly to a cigarette. When alarmed the creature snaps back its head and feelers into its wooden case and sinks to the bottom, where the sharpest eye cannot distinguish it from a twig. How subtle must be the instinct that prompts this low organism thus to protect itself from its foes, and, scientifically speaking, adapt itself to its environment! Like mankind with a wooden habitation in life, so, in case of sudden death, it is conveniently furnished with a wooden coffin. For a long time after first seeing the odd creature I supposed its wooden house to have been formed by eating the pith from a twig. But after catching a specimen and dissecting its home I found that it was built from sections of thin wooden tubing, which the inmate had cemented together so nicely that the fibres would part at the original wood before they would separate at the joints. That these joints were artificially made was proved afterward by the discovery of a specimen of the creature that had selected bright green bark for two sections of its tubing, and was dragging about a variegated house colored green and dark in alternate parts.

Closely related to the foregoing larva is another curious fellow, smaller in size and somewhat like a grub, that can be seen by hundreds under the black ice. This species builds up around its body a structure of small round leaves, undoubtedly gathered from some of the smaller water-plants. When its house is finished the structure looks precisely in form and size like one of the hops of commerce. Where the stem joins the hop is, in this creature's habitation, a hole whence the larva projects its head and feelers. With a dwelling twenty times its own bulk, this larva makes slow progress, though it can both swim and crawl along on plants. It seems to delight in rising to the under surface of the ice, and, when touched with a stick, by some occult means drops swiftly to the bottom, where, inverting its house, it grasps the grassy filaments, thus keeping its head protected and closing the entrance of its domicile. In many specimens it will be found that the entrance is strengthened by four little beams of wood laid in a perfect square, and serving exactly the purpose for which men brace up the earth or rock at the entrance of a tunnel. Still another, but much rarer, winter inhabitant of our ponds is green in color, sharp at both ends, and about twice the size of a mosquito. Just behind the head he is equipped with flippers, each about two thirds the length of the body. These flippers he uses as a bird does its wings, darting his body forward and flying through the water with a series of convulsive jerks.

The coming of the black ice gives rare opportunity to observe some of the winter habits of fish. If one reaches the pond early when the ice is clearest and before the noisy skaters have driven the fish into deep water, he will often find the pickerel in large numbers along the weedy shallows. In the summer the pickerel is the greyhound of fresh waters. No fish—not even the lithe trout—can rival the speed with which the frightened pickerel shoots through the watery spaces. But in the winter this fish seems to lose some of his swimming powers. When followed under the ice he goes swiftly, it is true, but with a clumsy, irregular motion, and not too fast for a rapid skater to follow closely. When chased thus until tired he ends pursuit by a dive into the thick weeds and mud, leaving where he hides a turbid bit of water. Often also may be seen beneath the ice a great school of sluggish suckers. Skate over them and they disperse as awkwardly as affrighted cattle, each in the other's way and ploughing up deep furrows in the mud by their wild efforts to escape. Seen in his common mood, the sucker seems the philosopher of fishes. His quiet life and his meditative habit give him an outward semblance of profound fishy wisdom. His big head, however, must be all skull and no brains, for the slightest fear turns it, and he falls an easy prey to the remorseless net and cruel spear. The tradition about the ostrich is a deadly reality in the life of the sucker, who will often push his head under a stone under the fatal delusion that his whole body is hidden from the pursuing

foe. He is a fishy type of the people who, by reticence and sedateness, get up a huge reputation for wisdom only to blast it when their first emergency comes.

It need scarcely be suggested that the coming of the black ice marks a rosy epoch of the year for Yankee boys—and girls. The brief season of Thanksgiving vacation loses half its character without skating, and no skating ever equals that on the glassy black ice on moonlight nights, when Cupid doffs his wings and puts on the gleaming runners. But at its best the black-ice season is sure to be a doubtful and transitory one. For a day or two after the cold snap so hoped and prayed for by youths and maidens, the surface of the ice may be so pure that the whitest finger leaves a mark on its clear face. In a day or two, however, the inevitable transition begins. Its crystalline quality departs, its surface becomes pock-marked, white bubbles somehow enter it, and the slightest thaw obscures that panoramic view of the underlying bottom which gives black ice its chiefest charm. Then comes winter in earnest, when the ice is hidden and thickens into those firm strata of frozen snow and water which make up the ice of trade. At last, too, arrives the period when even this ice, foot-thick and seemingly as eternal as the rocks, must follow winter to death. Then may be seen that strange phenomenon of the break-up which each spring brings to pass. To the unskilled eye the ice appears as adamantine as in midwinter, and after a brief cold snap it will be temporarily so strong that an ox-team may be

driven across in safety. But meanwhile softening forces are at work. Sun and rain disintegrate the ice-sheet, and the vernal south wind makes its surface wrinkled and porous. The whole vast area is like a bundle of ice-needles bound together by a thread; the open spaces increase day by day; at noon great spaces surge in wavelets under a man's tread; and, when the field drifts against the shore, from the surface shoot in air straight bars of ice driven upward by the strain. Then comes a warm day with a high wind to break winter's last fetter. Suddenly, as if by magic, the great field dissolves. The thread is broken, the ice-needles fall apart, and the flashing waters surging up signal a new season of leaf and flower.

THE OLD COLLEGE BALL-GROUND.

ACADEMIC base-ball, in most of its sanguinary qualities, probably differs not much from the sport elsewhere; nor can even the puissant mind of the college senior devise a plan to avoid the distempered joints and unscholarly aroma of arnica which everywhere distinguish the game. But if ever our national diversion has its dashes of sentiment and beauty, they would have been suggested by a scene like that at the old college ball-ground in New Haven one lovely day last May when, under blue skies and a bright sun, the nines of Yale and Harvard met for their first contest of the year. That annual meeting is the capital base-ball event in the sleepy academic town; local feeling in and out of college focalizes upon it as on no other competition save, may be, the boat-race at New London; youth and beauty, age and professorial dignity, all cluster together for the hour around the fateful diamond; and both at New Haven and in the return match at Cambridge the traditional rivalry of the two old universities gives an interest to the contest which quite eclipses the wider chances of the college base-ball championship.

It is strange that no American artist of fame has ever portrayed on canvas a spectacle of life and color like that

on the old college ball-field during this annual ball-game. Certainly one may go far and see many sights before so charming a scene will repeat itself. A broad expanse of greensward is edged with a distant grove on one side, and on the other the suburbs and pointed spires of the town. Northward rises the wrinkled front of West Rock, and southward through the trees is a broken view of the dimpled Sound. All this, however, is but the outer framework of a picture whose chief beauty is in its details. First the eye catches the forms of the nine players, whose bright tints in blue or red point with color the green field which serves them as a foil. Even were those colors less vivid, the sight of these strong college striplings, with their fresh, clear-cut faces, so different from the profile of the professional hireling, would be a most refreshing vision. Back a bit from the field comes that great wedge of spectators which is the most characteristic sign of a good ball-game. The long rows of white faces gleaming in the sun rise in strata one above the other, so densely packed that it seems as though the wedge were some great compound human animal stirred by one emotion when a good play on the field excites it. Finally comes another garland of color—carriages stretching in a crescent around the outer field filled with bouquets of girlhood, whips flying the college colors, long ribbons in blue or red, and a bright medley of tints fluttering everywhere in the wind. Suffuse all this spectacle with May sunshine, give it human motion and life, pervade it with

that subtile current of interest and excitement which college rivalry evokes, and then name, if possible, any more absorbing scene with no elements more serious than sport. That particular May-day spectacle deserved too, to be remembered long; for it was the last of the kind that will be seen at Hamilton Park for many a day. The ball-games will be shifted hereafter to the new athletic grounds of the college, and the old park, where so many generations of college athletes have contended, will be left to its memories. In a quarter of a century more, streets will intersect it, the sprawling city will cover it, and its identity will be lost under prosaic curbstone, roadway, and dwelling.

To the old ball-player who, ten, fifteen, or twenty years ago, bore, albeit feebly, his share on the college field, that last important game on the venerable park brought back some strange memories of the earlier past. Those were lively days of the sport back in '65 and '66. Just about that period a wild base-ball craze swept the country from end to end. Every village and hamlet bragged its nine, and mighty and fierce were the local rivalries generated. As played by rural nines, the game was breezy and democratic to the last degree. The ball, charged to its full with rubber, bounded among the dazed fielders with the ricochet of a cannon-shot. Curved pitching was unknown, and the ball was either delivered slowly or straight and swiftly. All the striker had to do was to take aim, "let out" muscle, and chance consequences. The big scores of those free-and-easy days read funnily now. I remem-

ber one eventful rustic game of but seven innings, when the score stood one hundred and forty-four to forty-six. More than forty runs were tallied in a single inning, and sixteen home runs were recorded altogether in that famous struggle. As to the bat, and, indeed, as to most of the details of the game, there was a code of rules, but there was boundless contempt of their terms. One country nine, famous for prowess in hitting, had its bats made of huge square pickets, "whittled" down at one end. Another team bore vast round beams of basswood as large as a man's thigh, bored out and charged with corks to make them light. Against the slow pitching of that primitive period these colossal pudding-sticks proved singularly effective. With the first bound "out," both for fair and foul balls, players in the out-field always waited till the ball struck the ground; and he was a hero indeed who recorded a long fly-catch. "Far, oh, far from gay," to use the words of a departed American humorist, were the relations of the umpire to the players and crowd. That dignified and responsible officer usually sat in a lofty chair, shaded by an umbrella of vast circumference. He was a grotesque figure, bellowing out his decisions in thunderous tones, the target for the fertile blackguards of the crowd, and fortunate if he survived a game without being superseded; for the lookers-on invariably constituted themselves a high court of appeal, without any legal delicacies of language. His, indeed, was, at games played in factory towns, a well-nigh tragic position, so

lively flew at times the stones and brick-bats around his airy perch; and not seldom it seemed as though he would have to qualify for reading the riot act and, after the game, call out the militia to cover his retreat from the field. Base-ball in those times, too, was spectacular as well as bellicose. Uniforms were of astounding cut, and as variegated as Joseph's scriptural coat. Every nine of prominence had its vivid badge made of silk ribbon emblazoned with the title of the club; and as these badges were exchanged at matches, and each player wore on his uniform these accumulated trophies, a base-ballist of those days as he sped over the field looked like a fugitive court jester.

At Hamilton Park the game used to be played in more gentlemanly spirit, and the umpire's place was not altogether an austere one. But some curious notions prevailed as to the way of forming an effective college nine. Heavy hitting was the prime requisite, and size combined with muscle were the credentials of the player. Hence the team was made up of a rollicking set of clumsy giants, tremendous but very uncertain hitters, and with scarcely more conception of the nicer points of the game than so many oxen. I remember seeing one of these college Titans strike a line-ball not more than four feet from the ground far beyond the centre-fielder, who stood much farther from the batsman than now; and one ball I recall, raised scarcely a foot from the grass, which first struck within a few feet of the right-fielder's place. Large scores

were, of course, the rule, and even down to '72 they ran up into the twenties. Many a funny incident crosses memory in looking back on those old days at the park. In one of the games a line ball struck the pitcher—a pulpy, round-headed classmate whose fame for slow twisters was largely due to a strong out-field—squarely on the side of the head. The ball caromed sideways to the third baseman, who caught it on the fly, putting the striker out amid shrieks of merriment. In another instance, during a match game a swift "liner" hit the short-stop on the ankles, followed up his body, and was caught at the chest. Perhaps, however, the most famous catch of all was that of an indifferent player at second base whose back happened to be turned just as a hard-hit ball was struck to him. He turned suddenly, exactly in time, as it seemed, to receive the ball in the pit of the stomach. But he threw out his left hand defensively, and the ball, to the utter amazement of the spectators, and even more of the player himself, "stuck" between thumb and forefinger. Another college player of those days was deaf, and played under a special dispensation that he should not be held responsible to the rules when running on foul tips.

Then as now the whole season's play at the park led up to the great game with Harvard in July; and certainly it seemed a perverse fate which year after year gave the opposing college victory by narrow margins of one or two runs. The real obstacle to Yale's success, however, was

one man, for three years Captain of the Harvard nine and then a predominating figure in college base-ball. To name "Archie" Bush is to recall probably the best college player that ever swung a bat or crossed the home-plate. Twice at least some of us can remember how his nerve, coolness, and infinite capacity for meeting a crisis baffled one of Yale's best nines; and once, in particular, during the contest of 1871, how his mighty sky-ball to the far left-field took victory in the ninth inning out of the very teeth of defeat. "Out of the woods, but not out of the Bush" then passed into a base-ball aphorism at Yale. A powerful hitter, a sure catch, a capital all-round player, a model of physical grace, and withal, a perfect gentleman, he will long be remembered as the ideal character of the college ball-field, whose untimely death was as sincerely mourned by old adversaries as by friends.

After all, that old game had its special advantages. Its varying ups and downs, its long hits, even its errors and general looseness, gave it spice and excitement. It had a scope and swing that one misses in these times of precise and mechanical play. But as a science it is amazing to see how college ball-playing has advanced. Dead-balls, curved pitching, and close play behind the home-plate have revolutionized the sport. As to throwing, too, in precision and speed, the later college ball-player leaves his predecessor of ten years ago far behind; and the same is true of all the in-field work of the game. The out-field play of college nines, however, shows no corresponding

improvement, partly, perhaps, because there is less work to be done. As compared with professionals, college players show about the same disparity as in the old period. In fly-catching they play the out-field better and the in-field quite as well. But they still lack the steady execution and, above all, the batting power in which the muscular long-trained professional must ever excel. In one respect to the eye of the old player, this modern highly-developed game shows a queer anomaly. It is positively more uncertain in its results between evenly-matched clubs then the game of ten or fifteen years ago. Then errors were many enough to offset each other, and the number of runs left rather more range in which superiority could express itself. Now, with but two or three runs on a side, a single costly error or a timely base-hit tells the story of a match won or lost. Paradoxical as it may sound, the more exact the base-ball science the less certain have become its results.

Sadder and more solemn changes than those of the game could be seen that May day on the old park, so soon to be forsaken. How strange it seemed to pass before the long rows of spectators and scarcely recognize one face! Some college professor, perchance, with wrinkles deeper set than once, one or two gray-haired townsmen, or a half-extinct college belle lapsing into spinsterhood, were all one could trace out from the goodly base-ball gatherings of half a generation ago. A more impressive mark of the gap of years was that strangely youthful aspect of the

student crowds which every graduate remarks, not because students are younger now than then, but because he himself is older; and finally the unfamiliar forms of the players manning the old positions—the scene the same, the old actors all changed. One whose tall, lithe figure once covered second base, now a church luminary, strong in exegesis; another whose long throws were the wonder of the whole college, now a sedate lawyer, stout and affluent; a third, a crack fielder, who already on 'Change has made and lost half a dozen fortunes; some climbing already to fame, some toiling on in dull obscurity; some poor, some prospered, and not a few whom the Great Umpire has already summoned in from the field amid those deepening shadows which, soon or late, shall close the long game of life for us all.

AN HISTORIC MEETING-HOUSE.

IN April of the year 1637 there arrived at Boston, in the ship Hector, a company of two hundred English colonists. In one important particular these settlers differed from many of the pioneer parties that preceded or followed them to the New World. They came not as refugees from kingcraft or as fugitives from religious rancor, but prompted by the more solid if less sentimental motive of making wealth. They had with them large means for those times, amounting, with due allowance for difference of values, to not less than half a million of dollars. They brought also the Bible, the Common Law, and pious traditions and habitudes. But their Yankee descendants, albeit much they may yearn to trace down their ancestral roots to some Mayflower soil of moral purpose and adventurous self-sacrifice, will seek it vainly in the early records of these colonists, who, leaving Boston in March, 1638, sailed around Cape Cod and entering the Sound "squatted" on what is the present site of New Haven. Here they plotted out their settlement in squares around a central rectangle, the original outlines of which the spreading city still preserves; they built them dwellings far too ambitious for their time and place; they organized a local government, established a court, reared

one or two storehouses, laid in a trading stock, and settled down with lofty hopes of gain by barter and foreign commerce. But partly by sheer bad luck in marine venture, partly by the unthrift and extravagance that were ill placed in a wilderness adapted to only the smallest beginnings, the colony went rapidly into decline; and only a few years later we find its estates shrunken in value, its commerce dormant, and its people hopeless and despondent. When it founded its settlement in 1638 the New Haven colony was the richest in New England; twenty years later, if not the poorest, it was, at least, the deepest sunk in listlessness and despair.

In early New England the town and the meeting-house were always born and nurtured together; and, without its place of worship to focalize its public and religious activities, the New Haven colony would have missed half its natal character. Ground for the first structure was, accordingly, broken promptly in 1638, not long after the colonists landed; and in the following year the building was finished—a quaint edifice whose architecture would excite the derision of a flippant posterity that associates worship with the ornate and florid church of our later days. The primitive meeting-house stood, a solitary and isolated structure, on New Haven Green. Its body was cube-shaped, rising to a sharp hip-roof, and the effect of the whole was that of a clumsy block-house. It was sixty feet square, with solid walls, and inside the pyramidal turret a sentinel kept lonely watch. This martial

type of our far ancestral church building was indeed not merely fitting but necessary in rough times, when the Indians roamed the woods and the sudden attack of a hostile tribe might drive a whole colony for safety to its ecclesiastical fort. The bell was hung in the centre of the turret, so that the ringer stood below in what would now be the aristocratic centre aisle. The material of which this ancient meeting-house was composed is somewhat doubtful, but it probably followed the analogy of the common church edifice of remote New England times, which had thick log walls, packed with clay, and a roof of thatch-work. A little way from this first New Haven meeting-house, and almost in the centre of the green, the colonists began to bury their dead in a church-yard, which ultimately broadened to an area of two acres and a half. The pioneer edifice was succeeded by a second meeting-house forty-one years later; by a third in 1757; and that gave place, in 1814, to the present "Center Church" which is, therefore, the lineal descendant of the original structure, preserving in its archives many a record and symbol of the past, and with annals so closely woven with those of the town that the two are like twin brothers in history. The Center Church, indeed, which may more fitly be termed the "New Haven meeting-house," is to-day something far more than the ecclesiastical home of a society which is a synonym for solid wealth and social place in a rich New England city; far more than simply a stately old edifice, whose firm brick walls, broad dome,

and soaring spire are typical expressions of old-fashioned church architecture. It is rather a great timepiece of the centuries, marking off the hours of history, and recording on its ancient dial events that, but for it, might long ago have passed into the shadows which, in this swift land of ours, so quickly make oblivion.

Pass into this venerable meeting-house between the thick rounded pillars that front its entrance. Over the central door-way an arch of marble tablets records briefly the coming of the old mercantile colonists, the founding of the successive churches, and the naming of the city. Within the vestibule another set of tablets is inscribed with the names of the dead whose dust lies under the building; for the Center Church is literally founded on its own founders, who were laid away in the ancient New Haven burying-ground on a part of which the edifice now stands. In 1812, when the cellar for the new church was dug, the disturbance of the remains of the fathers of the colony almost excited a riot and forced the magistrates to protect the laborers. From the vestibule a few steps lead downward to the crypt, a subterranean church-yard without a counterpart on our continent. All the old dirt floor has been paved with a thick lining of cement, and out of this solid mantle protrude the monuments that mark the resting-places where, long ago, the colonists with their families were laid away. A sombre sepulchral light steals in by day through a few square windows, and even the gas-jets, lighted at short spaces, throw over the ancient

stones a solemn and mortuary gleam. Most of the stones are thick, rough slabs of red sandstone, imported originally from England, though here and there is a block of mottled marble from an American quarry. The more ambitious tokens of the dead are of one invariable pattern—a thick slab resting horizontally on massive stone stanchions. The ghastly travesties of winged death's-heads and fat burlesques of cherubs with which our sober-minded forefathers unconsciously satirized mortality are cut boldly on many of the stones, and the quaint inscriptions, protected now for eighty years from the elements, are most of them as clear as when first sunk by the graver's tool. In the crypt rests the dust of a hundred and thirty-eight old settlers, a small fraction of those who lay in the town burying-ground on the Green, which, in 1823, was levelled off, the stones being removed to a new city cemetery. The oldest lettered stone in the crypt is that of "Sarah Trowbridge, wife of Thomas Trowbridge," who died June 18, 1687; but there are other slabs much older, the dates on which have been effaced by time. To a descendant of that Trowbridge, Mr. Thomas R. Trowbridge, Jr., of New Haven, the church, the city, and all lovers of the antique and curious, owe a large debt of gratitude for restoring the crypt and opening it to visitors.

One of the quaintest epitaphs in the ancient burial-ground was that over the grave of Theophilus Eaton, who, with the Rev. John Davenport, led the New Haven colony from Boston and was for nineteen years its governor:

EATON, so famed, so wise, so just,
The Phœnix of our world, here hides his dust.
This name forget New England never must.

To attend you, sir, under these framéd stones
Are come your honored son and daughter Jones,
On each side to repose their weary bones.

Governor Eaton and Parson Davenport, whose names are both perpetuated by many local titles in New Haven, were called the Moses and Aaron of the colony. Davenport left the settlement to become the pastor of the First Church at Boston, where he died in 1670 and was laid in the tomb of John Cotton. The dust of Eaton rests beneath New Haven Green a few yards from the crypt and fifteen feet northwest of the monument of John Dixwell, the regicide. As to the regicides, by the way, it is averred that the refugee, William Goffe, one of New Haven's heroic figures of history, is proved by records of the local Historical Society to have been any thing but a Scriptural Joseph in his relations with the wife of a prominent citizen of the early town.

A modest slab of brown stone in the crypt stands "In memory of Mrs. Margaret Arnold, wife of Benedict Arnold, who departed this life June 19, 1775, in the 31st year of her age." She is described as an exemplary and womanly lady, whose gracious qualities, had she lived, would have swerved her recreant husband from the infamous act to which his debts and the malign influence of his second and Tory spouse impelled him in later years.

Arnold's old sign-board with its quaint lettering is one of the foremost curiosities in the rooms of the New Haven Historical Society:

B. ARNOLD, DRUGGIST;
Book Seller, &c.
FROM LONDON,
Sibi Totique.

The traitor, as described by his New Haven contemporaries to graybeards still alive, was a man of slender but wiry frame, low stature, quick nervous temperament, and of general ill repute for too sharp dealing among his neighbors. He was a famous skater, and crowds used to gather on the wharves in winter to watch his mazy whirls on the ice.

Captain Ezekiel Hays, the great-grandfather of the ex-President, lies beneath the foundation of the church, just at the edge of the crypt. A stone, a few feet within, records the death of his daughter Mary, with an odd epitaph annexed which opens with the aspiring lines:

> Awake, my muse, range the wide world of souls
> And seek Maria fled with upward aim.

As may be noticed, the descendants of Captain Hays have eked out his family name with a letter that is commonly supposed by a fastidious posterity to soften the bluntness of an ancestral title. The same modern change may be observed in the family name of James Pierpont, a faithful pastor of the church, who lies in the crypt with

his three wives and several children, and who was the lineal ancestor of the "Pierreponts," of New York, Brooklyn, and elsewhere. A near neighbor of Parson Pierpont, in the dust of the crypt, is Pastor Joseph Noyes, who piloted his flock through the theological shoals of the New Light movement in New England, as the first impulse of Methodism was then dubbed. The famous Whitefield, when he visited the colonies about 1740, was cordially welcomed by this parson and preached in his pulpit. But when the great exhorter returned, three years later, he was deemed an agent of the adversary and was curtly refused the hospitalities of the New Haven meeting-house; so he took a not unseemly revenge by holding a mighty meeting of New Lights on New Haven Green, almost under the drippings of the sanctuary.

The stilted diction of mortuary tributes in old times appears on the monument of Jared Ingersoll, a colonial Judge of Admiralty, and "a man of uncommon genius which was cultivated by a liberal education and improved by the study of mankind, and adapting himself to all by a rich variety of sentiment and expression." But, as a rule, the inscriptions are graceful and proper, arguing an uncommon degree of refinement and good taste in the ancient New Haven colony. Proving the same local trait, is the singular absence from the burial-stones of given names adapted from the Christian virtues. Two or three "Thankfuls" have been laid away, but without any sisterly companionship of Faiths, Hopes, and Charities.

But they rest instead with the goodly company of Danas, Ingersolls, Lymans, Hillhouses, and Shipmans, whose names attest the rich blood that streamed through the veins of the old colonists.

Nor among the silent sleepers in the crypt must we omit Hester Coster, who, dying in 1691, left to the church that part of the Yale campus on which South College now stands. It was in those far-away days a rough lot, very like a cow pasture.

A single name in the auditorium above outweighs all those in the dry dust of the crypt. It refers to one justly called the Nestor of his church, whose six sons have inscribed upon his tablet words almost matchless in their beauty and fitness:

> BY THE GRACE OF GOD
> LEONARD BACON
>
> A servant of Jesus Christ and of all men for His sake, here preached the Gospel for fifty-seven years. Fearing God and having no fear beside, loving righteousness and hating iniquity, friend of liberty and law, helper of Christian Missions, teacher of teachers, promoter of every good work, he blessed the city and nation by ceaseless labors and a holy life, and departed peacefully into rest, December 24, 1881, leaving the world better for his having lived in it.

Many curious incidents of local history have been

brought down to us by the Center Church and its predecessors. While the present structure was building during the war of 1812 the Sound was blockaded by Commodore Hardy and his British fleet, which intercepted several craft laden with materials for the new house of worship. The Commodore partly, no doubt, from chivalrous impulse, but more largely by way of sympathetic recognition of New Haven's "blue light" Federalism, let the vessels go, bidding their captains tell the burghers of the Elm City that "he made no war on religion." Mr. Jeremiah Atwater, of New Haven, was in 1787 the contractor for the meeting-house that preceded the Center Church. Most of his materials had to come from Boston, but nails were imported from England in bags. Singularly enough Mr. Atwater found that one of these bags inclosed, instead of nails, a hundred Spanish silver dollars, probably stored away during Europe's troublous wars by some thrifty but absent-minded trader. No claimant ever was found for the treasure-trove, and Mr. Atwater had it melted up and cast into a massive baptismal bowl, eighteen inches in diameter, which is still used at the christening services of the Society. Mr. John Hodson, who died in 1690, and who by the very poetry of chance lies under the present pulpit, left to the meeting-house of those days five pounds sterling to buy a piece of plate. The money was exchanged for a silver tankard with the date and donor's name inscribed. The antique vessel is to this day filled with the wine at every communion service. Other pieces

of church plate are dated before 1750. The old church itself, during its two centuries and a half of life, has seen troublous eras and weathered many a theological and civic storm. At the outbreak of the Revolution New Haven sentiment was strongly tory, and at a rancorous town-meeting held in the building after the battle of Lexington, the younger and more ardent patriots of the town only succeeded by a majority of one in voting a contingent for the American army; while, during the trying years of bloodshed that followed, Parson Chauncey Whittlesey needed all his worldly sagacity to keep his flighty and errant flock intact. But, through heresy and schism, religious and political, the old church has preserved not merely its place as a beacon of its faith, but much of its traditional character as a sanctified town-hall. There the celebrations of peace took place at the close of the Revolution and of the War of 1812; there public receptions have been given to Jackson, Webster, and many another historical personage; there seventy-one classes of Yale have been graduated, and ten thousand students have received diplomas; and there meetings of public commemoration, from the first town-gathering two hundred and forty-five years ago down to the mournful services for Garfield, have been held.

The earliest records of the New Haven colony prove the custom of "dignification" in the meeting-house. The term meant, before the innovation of pews, the seating of the congregation according to rank. The front seat was

reserved for the governor of the colony and his deputy, in the next was seated the magistrate, while succeeding, in their order, were the deacons and other pillars of the church. Some broader distinctions, however, were observed; for single men of ordinary social quality had to occupy the cross seats, while the women were put in the centre of the church, and the boys in the gallery. The dignifying was done by a committee. In later and more democratic times the congregations, in rural churches at least, were dignified by age, and the committee had a peculiarly delicate task in seating those doubtful-aged spinsters who had slipped their birthdays. Funeral customs also were original. Up to the year 1830 all the New Haven bells were tolled for the dead. No hearse was used until 1794, and no carriages appeared in line up to a much later time. The mourners and friends walked to the grave, an act deemed far more solemn and decorous than to ride. The pall-bearers, before they began their serious journey, were always entertained with a liberal lunch, garnished by an abundant supply of strong liquors and loaf sugar. An old undertaker, a resident of an ancient town in Connecticut, guided not only by his own experience, but by knowledge of funeral habitudes before him, has given me some particulars of the old-fashioned ceremony. The procession was marshaled with the males two by two in front of the bier, the females following behind. The coffin, shrouded in a pall and mounted on a bier with legs eighteen inches high, was borne by six

friends of the dead. At intervals, when the manager of the ceremonies gave the signal, the double lines of men would pause, the first six men behind would approach and take up the bier, the first set of bearers would fall to the rear, and the whole procession then proceed. Friends dug the grave and filled it after the services; and it was a nice point of mortuary etiquette to shape it as closely as might be to the six-sided coffin, which was interred without any external cover. After the mound had been rounded off, the tall bier was placed over it, and there it remained in the open air, a ghastly token of death's latest mark in the village, until another funeral shifted it to a new grave. Ceremonies, however, were often rude and informal, and it is related that Parson Judah Champion did not scruple to head a procession on horseback, bearing to the grave an infant in its coffin laid across the saddle. The coffin of the period, save in the case of some wealthy member of the community, was built of white-wood or butternut, put together with ordinary screws, and a rounded tin plate, with painted lettering, recorded the name and age of the silent inmate. Occasionally, also, the plate would be unscrewed at the grave and kept by the bereaved family as a memento. Rites like these described, in which the sympathetic offices of friends were fitly prominent, appear with some variations to have prevailed in many of the old New England parishes; and there is one primitive village in Connecticut where to this day the town digs the grave and supplies the hearse for rich and poor alike.

How vividly with the recital of these old customs memory reverts to the other quaint and fantastic forms New England piety took on—to the pastor who could hairsplit by the hour 'twixt Free Will and Election, the pontifex of the village, infallible in all things sacred and most things secular, sometimes a vicarious doctor who in the same visit could minister elixirs for the body and the soul, often the only lettered citizen of the parish and always its social head; to his odd cross-grained rural flock, floundering through snow-drifts to crowd the arctic sanctuary and, while their bodies froze, warm their souls on fiery dogma; men, serious and reflective, who, to use another's phrase, always took up the poker of life at the red-hot end; to the youngsters of the congregation to whom the enduring tortures of the meeting-house seemed a foretaste of those eternal penalties so vigorously proclaimed from the pulpit; and to all the other queer outgrowths of that pious epoch, the singing-school, equally prolific in discord and match-making, and the sewing society which stripped character at home while it clothed heathen abroad. All these much-mixed and contradictory elements of the old New England theocracy, blending intolerance with independence, cramped dogmatism with sublime zeal, and domestic severity with neighborly kindness, come again luminously to view when we trace up the long line of New Haven meeting-houses from the dignified Center Church to the sacred block-house on the green. The austere fathers of the meeting-house, upon whose dust all around

the Center Church an unsanctified generation daily treads, could they rise in the flesh would perhaps feel like putting on corruption anew should they hear an orchestra on Commencement Day render the airs of Italian opera in the singers' gallery, or find each Sunday in the pulpit, a preacher whom even modern orthodoxy has assailed. Yet they might perhaps discern, far better than their own gloomy subtleties, a sunnier faith, a more cheerful philosophy, and a broader and brighter theory of peace and good-will to men.

ODDITIES OF FISHCRAFT.

THERE ought to be some piscatorial maxim to express the familiar fact that when the passion for fishing is once fairly settled in the angler's soul, it scarcely lessens till old age and debility sap his physical powers. Moreover, it is a further tribute to the energy of a passion, which old Izaak Walton misnamed "gentle," that it often exercises itself in the mere catching of fish. Many an angler who can fling out his sixty feet of fly-line, who knows every local haunt of the trout, whose creel never comes back unfilled, and whose art is perfect, never dreams of studying the ways and nature of his speckled victims save as that study may minister to his sport. Of the species with which his fish are scientifically classified, of their normal food, of their occasional erratic habits, he is ignorant as the veriest tyro with his alder pole, big line, and thumping sinker. It is well for such an angler, if, cloyed a little with repetition of sport, he, in later life, becomes more observant of fishy nature; if now and then he dissects the body of a trout, bull-head, or pickerel, watches their tricks in and out of the spawning season, and, in fine, merges some of the emotions of the mere fish-killer in the more exquisite satisfactions of the naturalist. He will in the end be pretty certain to discover some traits of the

most common fish which not only add something to science but help to dispel some of the most solidly founded fishy illusions.

That the trout, for example, is the most fastidious of fish and also one of the most shy are points which well-nigh every work on angling and the fiat of piscatorial lore both emphasize. But it is true only up to certain limits. The trout when hungry will take almost any thing for a dinner. Up in the wilds of Maine, long before the advent of the skilled fishermen and the onset of civilization, great droves of trout, of from two to four pounds' weight each, ran up some of the larger streams. Their numbers produced a scarcity of food, and a pioneer fisherman, whose word is absolutely trustworthy, relates that on a fallen log he has passed over a school of those splendid fellows without scaring a single one. With alder pole, a strong hook, and a strip of pork rind for bait, he used to catch scores with such ease that the thing became farcical sport. In the famous Nipigon River, above Lake Superior, at certain favorable seasons the most killing bait is either a stringy section of pork or a strip cut from the scaly side of a chub. The trout fastidious! In a single season I have taken several gorged with a half-digested yellow snake, half as long again as the fish itself. A frog, a toad, a tadpole, or a field mouse are occasional food for this king of game fish, which come into the experience of any fisher who has angled for a series of years. Trout also are cannibals. Up in Sullivan County, New York State, a school of trout

kept in a tank made a royal meal some years ago off the entrails and heads of some of their fellows which I had taken that day in an adjacent stream. Dissect, some dull day in June, the stomach of a large trout caught in still water. You will very likely find, besides an assortment of moths and water-flies, an adamantine June bug, possibly a shiner or chub, and, if the waters abound with them, a lizard. Many anglers also have observed, no doubt, that early in spring the trout's stomach seems to be filled with small corrugated pebbles; but not every fisherman has examined these pebbles closely. Break one in two between the fingers and it will be found to contain a subaquatic worm or larva. But sometimes they are veritable stones which, moved by the current, the fish pirate has doubtless mistaken for prey. The stony likeness is the result of a secretion which is a provision of nature for enabling the larva to escape detection on stony bottoms.

The reputation of the trout for fastidiousness is due largely to the love of the fish for pure waters and dashing mountain streams. But even to this rule there are some strange and unaccountable exceptions. Not many miles from the town of Litchfield, in Connecticut, is a stream which has been famous for trout as far back as the memory of the oldest resident extends. Along a reach of fast water on this brook for some twenty rods above a certain ancient sawmill, trout are rarely caught. For some forty rods below the structure, however, where the waters reek with sawdust and the decaying wood pollutes the

bottom, the fish is abundant. Then for a mile the waters become clearer, breaking into sparkling falls and into the long ripples that the trout loves; yet along this splendid stretch of water trout are so scarce that the angler of local experience rarely or never whips it; and still farther down once again the fishing is excellent. These zones of poor fishing in the most seemly parts of good trout streams are familiar facts to skilled trout-fishers everywhere. Some unseen pollution of the bottom or a subtle taint of the water is the only suggestion that can be offered as the cause. It is also a common fallacy that the clearest and purest mountain streams contain the best-flavored trout. On the contrary, the mountain trout will often be found white and insipid, those caught in gently sloping meadows usually surpassing them in color and quality; while the very best trout that I have ever known anywhere are found near the largest lake in Connecticut and in a stream that descends from it. The waters of the lake are rarely clear. They are fed from a large area of adjacent swamp, and in the summer they are filled with vegetation, which decays and ferments until the bottom can be seen at not more than a foot's depth. Yet in the stream referred to, filled with this pond water, are caught each spring splendid hog-backed trout, of the brightest hues, with uncommonly red flesh, and of so strong and luscious a savor that no fish of the species taken in other streams of the region are worthy to be ranked with them. The peculiar food

or habit that gives them their fame and flavor has as yet never been hinted at.

"As shy as a trout" has become a maxim of our language. But like most rules this is not without exceptions. In running water the trout is no shyer than other fish; but this, no doubt, is due to the obscuration of sight produced by the ripples. In the spring season and in still water it is true that the slightest shadow cast athwart the surface sends him in a twinkling to his lair. As the still water warms in the sun of June or July, however, the trout becomes so bold that often he is heedless of a person passing by only a few feet away on the bank; and at this hot season he is often wired by unscrupulous fishers with the familiar slip-noose on the end of an alder pole. I had, toward the end of June of one year, a curious illustration of the erratic summer habits of the fish. In the deeper part of a long piece of still water I discovered two large trout that had struck up companionship with a school of a dozen suckers. These suckers, alarmed by my presence, swam together up and down the pool, closely accompanied by the trout. The aristocratic fish seemed to feel a sense of protection in the fellowship of their plebeian brethren, much as a blooded king might surround himself with peasant troops on a battle-field. These two trout, although I almost snubbed their noses with the worm, would not bite that day. But a few mornings later, by crawling to the pool I caught the larger, weighing three quarters of a pound. A more

striking incident, showing how tame the trout sometimes becomes in warm summer waters, dates back some twenty years, when the writer was a school-boy at the little town of Washington in Connecticut. Mr. W. H. H. (Adirondack) Murray, was at that time pastor of the leading church society in the village, and in the infancy of his piscatorial fever. Below a dam of the Shepaug River, flowing west of the village, early one summer afternoon, we found two great trout lying with their heads under a stone. They would not take the bait, and finally Murray with a noose of small brass wire reached down three feet in the water and actually lifted one of the fish to an angle of forty-five degrees before he could pass the wire above the anal fin. Then he threw the victim high in the air and it fell safely on the bank. It was an unsportsmanlike business, but the spectacle of a trout allowing itself to be almost "stood" on its head without taking the alarm was one that the angler will not often see rivalled. Another story relating to the summer madness of the trout will scarcely be believed, but is unqualifiedly true. Some fifteen years ago I saw a fugitive two-ounce trout in water three feet deep take refuge in a dark angle between two rocks. I reached in, touched the fish, and the next instant felt him run up my sleeve to the armpit. To capture him then was merely to lift the arm, wade to shore, and drop him out on the sward.

The ugly bull-head, also dubbed bullpout and catfish, seems a sleepy sluggish fish, whose big mouth invites easy

hooking. Though very savory on the table, he is deemed a most vulgar fish, and indeed is far from gamesome; yet his big head contains some refined brain lobes. In June, after his young are hatched, he leads them out in a black swarm, pilots them to feeding grounds, and watches them with fatherly solicitude. One may see the bull-head, when thus in charge of his infant flock, act exactly after the fashion of a partridge, who, with much fluttering and simulating of a wounded bird, leads the pursuer away from her brood; just so the bull-head will swim away, at first slowly, then faster and faster, to draw away the foe. The horn which, like the boom of a sail, fringes the bull-head's pectoral fin, is a genuine curiosity. When raised for defence it stands out so inflexibly that the strongest pressure by the thumb will scarcely force it down again. If the root of this horn is dissected it will be seen how shrewdly nature has devised it as a weapon of attack and defence; for at the bottom is a flange which, when acted on by particular muscles, travels around a long curve until it falls into a niche of bone where it stands fast and immovable against the foe. Though the bull-head is reckoned a nocturnal fish and really seeks his prey at night, it is not commonly known that the best time for taking him is at high noon on a sunny summer's day. Then the hated sunlight drives him to the deepest mud bottoms of his pond. If those mid-day abodes can once be found and the anchor rope is long enough, one can catch scores of the fish with

absolute certainty. A trick in catching him both by night and day is worth knowing. A friend who once had occasion to study the habits of a bull-head that was confined in a tank with a mud bottom, observed that the fish would often follow up the trail in the mud left by an angle worm thrown in for food. Sometimes, fifteen minutes after the worm had been dropped and after it had made a trail three feet long, the fish would cross the little furrow, then, turning as abruptly as a sleuth-hound, follow up the track, and secure the wriggling prey. Ever since that my friend has practised with immense success the device of a long throw with a well-leaded line, which, drawn slowly along the lake bottom, leaves a track which no bull-head ever crosses and leaves behind. Curiously enough, although our Northern bull-head is a bottom fish, the larger Southern catfish swims by day near the surface and often breaks water. In the St. John's River, near Jacksonville, Fla., where catfish are called "kitties," they may be seen weighing a dozen pounds each, swimming in the sunlight with dorsal fin above water, and every few minutes lashing the surface into a miniature Maelstrom with their big tails.

But of all fresh-water fish the pickerel is most paradoxical and singular as to some of his traits. The greyhound of our rivers, no fish living matches him in the speed with which when frightened he can dart through the waters. Yet lying perfectly still, ruminating along the edge of some shady water-nook, he may be touched almost

with the hand before he takes flight. Some incidents to prove his comprehensive and enduring appetite will, I fear, make the voracity of the fish discount the veracity of the writer. Nevertheless they are rigidly true. Standing knee-deep in water, I have known pickerel to pass between my legs in pursuit of the bait. I have seen them take a big shiner when gorged with protruding fish almost half as large as themselves; to seize fiercely a new bait just after breaking successively two snells which were afterward found in the mouth with their two hooks and baits attached; to swallow snakes, frogs, mice, and any living thing not too vast that has come within reach of their insatiable maws. The pickerel is an inveterate cannibal, and an oblong slice from the stomach of one of its own kind is a most dainty and taking bait. Fishy as sound some of the newspaper stories of pickerel gorged and strangled in the attempt to swallow a big victim, there can be no doubt that many of them are trustworthy. A single reminiscence may be cited to prove the pickerel's gullibility and appetite. Some ten years ago I caught one of these fish, landing him on a smooth grassy shore, ten feet from the edge. In taking him off, he broke the line just above the sinker, which was some two feet from the hook. As the broken snell was somewhat frayed, I replaced it, and while doing so the fish flopped into a musk-rat hole, which had one of its extremities under the bank at the river's edge. Presently Mr. Pickerel appeared in the stream, trailing two feet

of snell and the lead. He instantly took a second bait and was readily landed again. That rash pickerel had been dancing for fully a minute on the grass and had found his way through a dark hole for ten feet to the stream, not to speak of his other enlivening, though not instructive experiences. I have also caught a dozen handsome pickerel in a small river pool in which some youngsters were bathing, the fish shooting freely into the muddy water among the sportive lads, to snap the bait. Any angler experienced in pickerel fishing can no doubt recall similar incidents without straining credulity half as hard as this fresh-water shark sometimes strains his gullet.

AMONG THE MANIACS.

ON the western edge of the city of Utica, in the State of New York, capping a sloping ridge of land, stands the great State Asylum for the Insane. It is a grand structure, fronted by a graceful row of massive pillars and flanked by wings several hundred feet long, which stretch backward enclosing a broad area of courtyard. All around are open grounds with curved lawns and pretty clumps of trees, forming altogether a lovely park, the boast and delight of Utica residents. There, within the walls, year after year more than six hundred patients are under treatment. They come from all grades of life and from every trade and profession. Some remain for years with intellects clouded up to the day when they enter the scarcely deeper shadows of the grave; others, perhaps needing only rest, stay but a few days, then return to active life. The institution is like a vast hospital in the variety and scope that one finds in mental disease, and it reveals to the visitor strange and sad sights. It needs some nerve and not a little inquisitiveness to make the four hours' trip through the long corridors and wards, even though the constant presence of a member of the asylum staff assures safety.

First, at the suggestion of the doctor guide, comes a

glance at the office of the institution, where each case as it arrives is noted, the diagnosis of the patient made out, and, so far as may be, a thorough record obtained of past symptoms of the incomer's disease. A large room crowded with volumes relating to nervous diseases here arrests attention. It almost travesties human knowledge to look upon this huge array of literature and then reflect how little is really known as yet about those subtle disorders of the brain which bring their victims by the hundred here. "Perhaps we should know more if the books were fewer," pointedly remarks the doctor as he takes up his bunch of keys preparatory to our weird journey. Now is your opportunity to catch a hasty view of the doctor himself in his official personality. He is a man some five feet eight inches in height, weighing perhaps a hundred and forty pounds, of quiet bearing and with just a trace of accent bespeaking his English race. But his well-knit figure betrays latent muscular strength, and under his glasses his restless eye, which seems to look in all directions at once, proves the keen habit of observancy bred by long years in the Asylum. You can but mark, too, an occasional nervous quickness of movement, and as he opens the door of a ward he always darts through, leaving myself and a comrade, an old college mate, to follow at our leisure. This comrade, by the way, on this occasion wore an overcoat of mild green tint and was consequently dubbed "Saint Patrick" by one of the lunatics whom we met later during our rounds.

Presently we reach a stout oaken door, self-locking, like all the ward doors of the institution. The doctor turns his key, and in a moment we stand in the vestibule of madness. It is a great corridor, impressing one instantly by its magnificent length and width. Its floors are polished until they give back our shadows. Pictures hung on the neat walls give a tone of pleasant domesticity, and through the side doors are caught glimpses of sleeping-rooms that are the very pink of cleanliness. "This," says the doctor, "is the ward for slightly insane or convalescent women," and indeed, the patients sitting around the corridor in their arm-chairs, conning books or magazines, and answering with quiet coherency the doctor's questions, are the last people we should suspect of lunacy. But with sharp eyes the morbid signs may be detected. A strange look out of the corner of the eye, a restless jerk, now and then a tinge of languor or melancholy, and almost universally a pallor of the skin, disclose the occult mental humor. Sometimes, too, even in this ward, does the mania cunningly concealed break forth in raving, and a victim seemingly almost well becomes suddenly a human demon—so deceptive are the phases of insanity, and so infinite and trying the forms of quick madness that the poor demented brain takes on.

"Here," says the doctor, as turning his key we enter a large oblong room, "is the melancholia ward." The place, like its predecessor, is neat and tidy and with the same bright floors, but its walls are more poorly fitted and

less adorned. Large arm-chairs placed near the walls in single rows are filled, most of them, with silent female figures. These women are in every attitude of profound depression, and each has her hallucination over some past, present, or impending sorrow. One looks straight ahead with fixed gaze, refusing any reply to the doctor's queries. Another raises moist eyes and answers with sad voice, but quite coherently. Some sit for hours bent forward face on hands; others leaning sideways and resting on one arm weep silently. In the corner is a plainly-dressed old lady seventy-five or eighty years old, but still with a keen intellectual face. You ask her a simple question and she answers with a brutal oath. The most horrible delusions harass these poor creatures and are as real to them as the actual events of every-day life to the sane. They have lost their all, a dear friend is dying, calling to them for aid, they are condemned to die and ere long are to be executed—these are some of the more common delusive fancies. A great proportion of the inmates of the asylum pass first or last through this abode of gloom, and out of four hundred and twelve admitted in 1882 one hundred and thirty were victims of different forms of melancholy. This stage of insanity often lapses into violent madness, and is peculiarly marked by the suicidal impulse frequently veiled under a deceit so cunning that the utmost watchfulness of the nurse fails to thwart it. Another sad suggestion presents itself in connection with this form of mental disorder. The figures quoted above show that

more than thirty per centum of the patients admitted last year were afflicted with melancholia. Necessarily many of these initial cases at their most important stage have to be treated together and under the morbid influence which a group of despondent lunatics reflect on one another; nor, with the necessarily limited resources granted them by legislatures, is it possible to see how our public institutions for the insane can escape the evil. Yet this, on the other hand, is peculiarly the class of lunatics who, kept too long at home by the misguided tenderness of relatives, perpetrate very often child-murder and suicide in one bloody act. They are dangerous if kept in the household, while the State, without unendurable taxation, cannot provide them with isolated quarters and separate treatment. From this single example we may realize both how bitter may be the visitation of insanity in the homes of the poor and how difficult is the general problem of managing a great asylum of the State.

Now we approach the door which opens into the maniacal or, as it is termed at the asylum, the "disturbed" ward for women. Ere we reach it there comes a startling medley of sounds beyond the thick oak. A chattering of loud human voices blends with shrieks, imprecations, and wild appeals. We enter. The room is larger than most of the wards, better lighted, and with the same rows of chairs set around the walls. Not more than half of the seats are occupied, for thronging the floor is a crowd of creatures whom one almost hesitates to describe as human

beings. They rather seem unsexed demons dressed in the rough garb of woman. Their dishevelled locks, their horrible contortions of the face, frantic gestures, and unearthly yells, give one for an appalling moment a realistic vision of pandemonium. One of the demons dashes across the floor back and forth, stamping her foot and striking at imaginary fiends. Another, struggling in the hands of two nurses, madly implores our aid. Half a dozen flock round to shake our hands and pour out stories of their woes. One thrusts with cunning leer into my hand, while the doctor's back is turned, a roll of torn newspaper which, to her distorted mind, contains a recital of her wrongs. A thick-set, powerful creature, who says she is the Holy Ghost, imprecates all sorts of curses upon us, while another on her knees begs to be taken back to friends. One screaming girl rushes to the door to bar our exit, and as the nurses draw her away, struggles desperately to return. But no picture of details can do half justice to the scene as a whole—to the mass of frenzied furies, the discord of fearful sounds, and the awful impression of something weird and unearthly which oppresses the visitor as he gazes on the scene.

Then the doctor addresses a lunatic better behaved and more subdued than her wild mates. She is a gray-haired woman who bears in one hand a torn copy of the Bible, in the other a rolled-up newspaper. She is, he explains to us later, a preacher's wife once of great capabilities as a church worker, and so gifted as an exhorter that her hus-

band often used to allow her to take his place in the pulpit. "Will you recite to the gentlemen 'The Sword of Bunker Hill'?" asks the doctor. She consents, and then, the doctor leading by the arm a maniac who had been fighting her nurses, we all go into a large adjacent sleeping-chamber where the yells cannot penetrate. Here the old woman begins her recitation. The first few lines are in the words of the original piece. But presently she begins to extemporize, depicting in prose of most amazing vividness and power the rise of the old man from his bed, his call for his sword, his orders to the troops, and his call to them to "charge." Of course she gets history and every thing else distorted, but the beauty and force of her extemporized speech are marvellous—for she never recites in the same words. Then, at the doctor's order, she opens the window and counts the dead as realistically as though she actually sees them on the green lawn. Her voice has the volume of a bull's lungs, and sinks to the lowest masculine bass. Meanwhile the other and more violent maniac has thrown herself on a bed still screaming. But at a momentary allusion to the Bible by the reciter, her shouting comrade cries out: "Oh, I believe in that sacred book and I will die in its faith!" then bursts into tears, becomes as quiet and docile as a child, and is led back without a struggle to the nurses, whom five minutes before she was fighting tooth and nail. Nothing can be more curious than these sudden changes in the temper of the violently insane, wrought by some simple word or act.

What a life must the nurses live in such a Bedlam—compelled to stay with the maniacs for five and a half days each week, during night and day, and forced constantly to watch, restrain, and care for this company of human furies! Not more than three nurses seemed employed in the ward of twenty or thirty maniacs; yet I am assured by a nurse, who for some years had the care of the violent ward of a New England State asylum, that the general charge of a body of maniacs is less onerous than the special care of one maniacal patient who must be closely and personally attended. Let me use substantially her own words in describing her experience: "We outlive quickly most of our fear of our patients, for we know by a peculiarity in the eye of each one when a dangerous outbreak is at hand; and finally we reach so callous a stage that sane people outside seem for the time lunatics, while the maniacs seem sane."

Next the doctor leads us to a second long corridor, where dwell those whose minds are darkened for life. Many of these wretched and hopeless victims carry the most extraordinary delusions. Sometimes the same hallucination lasts for years, then changes in an instant to a fresh one, which may continue many years more. In other patients the fancies succeed each other as rapidly as thought can flit through their frenzied brains. One woman in this ward refuses to let her pulse be felt, and associates any attempt to do so with an effort to take her life. Another tells us: "In 1862 I gave orders that every

criminal in this country should be brought before me and shot. God warned the American people to obey my orders, but they refused. Ere long, therefore, God will slaughter this whole nation, and that beautiful lawn out there will reek with blood." Another assured us that she was the wife of our doctor guide. "Does he make you a good husband?" I asked. "Well," was the reply, "only so-so; but I 'm getting him in trim, and soon hope to quite reform him," and the laugh this time was on the doctor. A Utica lady, who some years ago went the rounds of the asylum, tells of a patient who always took care of her own room, would never allow even the doctor to enter it, and, while keeping every thing as neat as wax, refused to set any thing in order. She was an excellent painter, and once passed out from her room for inspection a pretty picture of tree-boughs supporting a bird's nest with four eggs in it. "You have got that picture wrong," remarked one of the doctors. "Don't you see that if you turn it upside down, the eggs will fall out?" "Why, that 's so," answered the patient; "I must change it so that the eggs will stay in." In the ward for demented males we found an odd character whose hobby was social philosophy, and who divided mankind into two classes—"moral destructionists and moral preservationists." His definition of life,—"Existence under two sexes,"—if original, would do credit to a saner mind. This fellow talked quite rationally on his pet theme; but the moment he left it, drifted into insane twaddle. In connection with

this matter of delusions of the demented, reference may be made to a case in the Michigan Asylum at Pontiac in that State. As the story is related, Governor Jerome, of Michigan, was visiting the institution, when a patient, suddenly confronting him, said: "Do you know who I am? I 'm the future husband of Queen Victoria. She 's coming over to marry me in a fortnight. Now, Governor, do you know how we are going to make our wedding tour? We intend to have a railroad built in a straight line from here to Portland, Maine. Then the Queen and I will get on a splendid saloon car, which is to be run with constantly increasing velocity until at Portland it reaches a speed of two hundred miles an hour. It will run, without slackening speed, on a ferry-boat waiting at Portland, and the boat will then be driven by the momentum straight across the ocean to England."

The male wards at the Utica Asylum are much less interesting than those for the female patients. The men seemed to have fewer odd fancies than the women, and, in the disturbed ward, were much less noisy and violent. In this disturbed male ward we were shown a patient in a short canvas sack, laced behind the back, and with long sleeves reaching far beyond the hands and also tied behind. "Loosen him," said the doctor to the two stalwart attendants. It was done, and in an instant the maniac had rent his underclothing, and in a moment more would have been stark naked but for the interference of the men in charge. The trip through this disturbed male ward,

with a crowd of the strong lunatics pattering on a few feet behind the visitor, is a severe test for weak nerves.

A peculiarly interesting ward is that for the victims of "paresis," a disease of the brain marked by the inability of the patient to pronounce the labial consonants, and certain to result in death in a period varying from a few weeks to several years. "Pronounce parallelopipedon," was the doctor's order to one of the victims, answered by a reply reminding one of a drunkard in his cups. The paresis patients are usually in good spirits and well-behaved, but occasionally suffer violent outbreaks and have to be restrained by the strait-jacket, or what is said to be the only other form of discipline at the asylum, known somewhat widely as the "Utica crib." This crib is merely a large crib bedstead, very strong, and with a massive slat cover closing down upon it enclosing the frenzied patient. The victim lies on a mattress, with bed-clothing, but is allowed ample room to turn over, and suffers no more real discomfort than if in an ordinary bed.

After all has been said and done, how imperfect at the best must be this necessary treatment of the poor insane in a great asylum at public expense—treatment always *en masse*, with an insufficient force of underpaid nurses, who are expected to serve in a pandemonium at fifteen dollars a month and board, tending violent and homicidal fiends with the patience of a stoic and the skill of a modern trained nurse; the institution itself perhaps crippled by the whims of Legislatures and compelled to do its poor

best with resources wretchedly inadequate. It may not be generally known, by the way, that the curability of the insane is greatly over-estimated. Doctor Pliny Earle, superintendent of the State Asylum at Northampton, Mass., who has probably given this subject more attention than any living American, quotes with his own approval these words of an English authority: "In round numbers, of ten persons attacked by insanity five recover and five die sooner or later during the attack. Of the five who recover, not more than two remain well during the rest of their lives; the other three sustain subsequent attacks during which at least two of them die." In other words, only one out of five insane persons makes a permanent recovery. I did not know of these sinister statistics, when, a little while ago, we passed out between the massive columns of the Utica Asylum. But even then the great structure seemed, as kindred institutions must ever seem to me hereafter, the tomb of the better part of man; while its fair lawns and encircling sun-lit trees appeared counterparts of the greenery with which modern fashion at burials sometimes hides the grim edges of a newly dug grave.

SILVER SPRING.

ON the western bank of the St. John's River, about twenty-six miles above Palatka, Florida, there comes a little break in the long line of tropical woods. This gap is the mouth of the Oklawaha River, which has its source in Silver Spring, one hundred and ten miles to the westward. These miles, as given, measure, not the distance on the map, but the windings of the stream, which twists and doubles back like a snake, taking up three crooked miles for each straight one overland. Up the Oklawaha during the winter months of active tourist travel there plies a little steamer which carries its passengers to Silver Spring, where they take the cars to Palatka or reverse the journey.

The voyage on the Oklawaha of a day and a night, from Palatka to Silver Spring, is one full of new experiences for the tourist, however much he may have travelled. The little steamer that takes him is probably without a mate or match among the water-craft of the world as respects its nautical structure. It is some fifty feet long, with high upper works, the plan of which is something midway between a canal-boat and Noah's Ark. The wheel, not more than two feet broad and a dozen feet in diameter, is set into the boat's stern, striking the

water with shallow blades which always play above the flat bottom of the craft. Beyond the wheel project two broad rudders united by iron rods so as to work together. The boat draws about two feet of water, and her hybrid model has proved to be the only kind fitted for navigation of the snaky Oklawaha. With her twin rudders she can turn in twice her own length; her crew think nothing of a bump against the bank or on a bar, for she is readily pushed off; and, queerest of all, with her elevated prow she runs fearlessly over huge logs which float within an inch or two of the surface. They rasp and groan as they grate along the much-battered bottom, but as they pass below her wheel they leave her without substantial injury. One can look the world over before he finds a craft like this that jumps logs like a race-horse and takes bump after bump with cool unconcern.

The water journey up the river is made through the depths of a moss-hung tropical forest growing in the swamp, with only two or three landings at small settlements to break the routine. But the bends in the stream, the sylvan vistas with their streaming pendants of hoary moss, the strange tree forms and vegetation on the banks, and the animal life of the stream lend constant variety and change to the voyager's eye. Even in the winter flowers give color to the weedy banks. The water-lettuce, a plant like the Northern edible, which grows floating in the stream, drifts by in shoals. The remoter banks are verdant with Southern evergreens, magnolia,

live oak, and mangrove, interspersed with the great cypresses, which have singular wooden cones, called locally "knees," springing from the roots. The trees are covered with a singular growth called the air-plant, resembling the tops of the pineapple. These air-plants drop their seeds in the interstices and crotches of the trees, taking root there, and thus getting their appropriate name. A common growth very strange to the Northern eye is the palmetto, most tropical of tree types, which along the Oklawaha springs up in groves, in which are some individual trees seventy feet high, straight as a cane, and without a limb up to the luxuriant tuft that crowns the shaft. Fish dart among the lily-pads, and ducks or long-legged cranes, startled by the boat, fly into the forest or up stream; while on sunny days the alligator is often to be seen basking on the sloping logs. At night, when these wild, mossy vistas are lighted by pine knots, blazing in an iron cage on the pilot-house, the spectacle has a weird beauty that defies metaphor. With the electric light, which erelong will probably supersede the yellow pine flame, these Oklawaha glades by night will be an even finer spectacle. When about six miles from Silver Spring, the boat enters Silver Run, which comes directly from the spring, and the opaque waters of the swamp are changed suddenly for that beautifully clear fluid to be described hereafter. Every living thing below of plant and fish life, the black catfish, the sharp-nosed gar-pike, bass, and other fish become as clearly

outlined as in air; and bending over the rail the scene in the deep waters below is an endless panorama of interest and beauty. Silver Run, though often not more than thirty feet wide, is of immense depth, sometimes reaching fifty feet, and averaging at least ten. Just before one reaches it on the Oklawaha, the boat passes through the "Gates," two trees opposite each other on the banks, and so near that the hybrid craft barely scrapes between.

Silver Spring, the basin where the Oklawaha has its source, is probably, regarded merely as to size, the largest spring in the world. I have measured with some care the amount of water which pours from it into Silver Run, its outlet. A cross-section of the stream would probably average sixty feet wide and ten deep all the way across, with a current flowing some two miles an hour, often, however, becoming so swift that it boils in surges. In the centre the channel of Silver Run probably averages twenty feet, and but for its bends a good-sized ocean steamer could navigate the stream from its source to its end. All this vast volume of running water comes from the spring, whose only inlets are at the bottom. The spring itself is an oblong basin, covering about two acres. At its upper end is a sudden depression of the bottom, which forms a kind of sub-aqueous cliff of horseshoe shape. The bottom, to describe it more figuratively, falls away into the figure of a round clam-shell placed on its convex side; only, to make the figure complete, there

must be imagined ten feet of water over the "hinge" part of the shell, which at that point descends suddenly in a watery precipice twenty-five feet deeper, and out of a vast hole under the precipice, and unseen by the eye, pours the immense stream of water by which the spring and its outlet are fed. The size of this mysterious hole never will be known—unless explored by divers—for the overhanging cliff covers it. But it can scarcely be less than ten feet in diameter, and is probably much larger.

Popular fallacies in regard to wonders like Silver Spring will always be found to increase inversely as the distance from them. The nearer a Florida native lives to the spring the greater his exaggerations. I found no one at the spring who estimated the depth in the horseshoe depression at less than sixty feet. By many careful soundings I found its maximum depth to be thirty-seven feet, and average depth about thirty.

The most wonderful property of Silver Spring is the transparency of its waters. The bottom, at its greatest depth of thirty-seven feet, is outlined with a clearness which takes away completely the sense of an intervening fluid. Floating in a boat and gazing downward, it is hard at first to overcome the illusion that one is falling. Every little leaf, each branch of the waving water-plants, all the little sand-banks, are defined with absolute distinctness. The mystic gorge from which the water pours, and a tree which has fallen in it, startle the eye by their realism. Strange and beautiful optical illusions are created by this

translucent fluid, compared with which the famous waters of Lake George are positively opaque. A piece of tin, a shell, or any other bright object becomes opalescent, the edges fringed with deep blue. Where the water is really thirty feet deep, it seems as if a ten-foot pole would readily touch bottom, and the rifts of sand, filling the crevices of rock, reflect a thousand iridescent tints as the rays of light touch the grains at different angles. Fish, of which there are many in the pool, appear like birds in the air, moving on impalpable wings. By careful experiments on a still, bright day, it has been found that, looking vertically downward, letters on sunken cards can be read at just about the same distance as in the atmosphere above.

The waters of Silver Spring preserve a very even temperature, rarely rising above seventy-six degrees Fahrenheit, and almost never falling below seventy-two. To the hand the water feels like that of a country lake in midsummer, and bathing in it during midwinter is not uncommon, and is described as a most delightful sensation. So warm is the spring that its water has to be cooled before it is fit to drink. As it is strongly charged with a solution of the limestone from which it emerges, the water is hard; but when drunk it has the tasteless quality of the purest water. The warmth of the spring in contrast with the atmosphere was strikingly demonstrated during one morning of my stay, when the mercury sank almost to the freezing-point and the surface of the great basin steamed like a hot caldron.

There is much obscurity as to the origin of the wonderful spring. Some people conceive that it starts from far down in the earth's bowels, and that thus its high temperature is accounted for. Springs resembling it in some general features, though much smaller in size, are found a few miles away, indicating either an extensive subterranean reservoir under pressure or a system of large streams under the earth. In several places in the neighborhood, not many miles off, are rough holes nine or ten feet deep, down which the visitor can descend to large running streams of water clear as that of Silver Spring. These streams pass over the bottom of the sink-holes, then into the earth again, only a small surface being visible. Another theory is that Silver Spring is supplied by underground outlets of several clear lakes ten or fifteen miles off. One of these lakes, however, has within a few years trebled in size and depth, indicating that its hidden outlet has been obstructed; yet no effect has been observed on the waters of Silver Spring, which never vary up and down more than two feet, and are highest in the rainy season. Besides the mysterious hole at its head, there are a number of other large inlets at the bottom of the basin, which are marked by the bars of beautiful opalescent sand which they emit; and all along Silver Run, for six miles, similar reaches of sand show that it is partly supplied with springs of its own, independent of the head-waters. One of these subterranean inlets, just below the place where the run leaves Silver Spring, is no small curiosity. Twenty

feet down in the clear waters is the opening of a rough chasm, out of which the waters pour at a rate that causes a very perceptible surge on the surface. According to local belief and assertion, the bottom of this chasm is eighty-five feet below the surface. I sounded it many times with the utmost care, and found it only forty-one feet deep, making the bottom of the chasm proper twenty-one feet below the surrounding level of the bottom of the Run. Still farther down stream are a curious system of round subaqueous well-holes. Their tops are about seven feet below the surface of the water, and their bottoms, as sounded, about eighteen feet farther down. All this curious system of chasms and well-holes goes to prove an immense underlying stratum of easily disintegrated limestone extending for many miles and ramified by numerous water-channels.

Silver Spring abounds in fish, and dozens at a time can be seen in its pure waters. At certain seasons, usually in spring-time, they bite freely at bait, but they are usually too sophisticated for the ordinary hook. The routine of fishing here, one day during my stay, was varied by a new sort of bite. A large tame duck, of a species that can fly almost as well as its wild fellows, seized a bait attached to a line and rod on the wharf, got well hooked, and quacking with fright, flew across the waters, dragging the long attachment behind in most comic fashion. Fortunately for the victim, the pole caught a fisherman's boat, and the bird was drawn in and released. The local fishermen take

advantage of the clearness of the water to kill fish in a most unsportsmanlike manner. A barbed spear and a thin pole fifteen feet long are hung to a cord of equal length or longer, noosed around the wrist. This cruel spear is flung after practice with wonderful precision, and even small fish—always hard to spear—are slaughtered when swimming at great depths.

Like almost every wonder of nature on our continent, Silver Spring has its Indian legend. Tradition tells how, far back in the shadow-land of history, Wenonah, the beauty of the tribe that dwelt around the spring, won the love of Chullotah, chief of a hostile tribe, and her father's deadly foe; how the angry father—with a Florida name too polysyllabic to spell out here—sought out and slew the lover; and how then Wenonah drowned herself in the crystal depths, where the long-waving weeds still symbolize her hair, and the opalescent sands betoken the broken shells of her coronet. But Silver Spring needs no legendary attractions to make it both beautiful and marvellous; though a jewel so literally of the first water deserves a fairer setting than the low gloomy swamp and thin row of gaunt trees that surround it.

CATCHING THE GRAYLING.

AN area of ten counties in the northeastern corner of the southern peninsula of Michigan may—though on a much more ample scale—be likened to the Adirondack region of New York State. The tract includes a region of not less than eight thousand square miles, or nearly twice the area of Connecticut. Where it abuts on Lake Huron this wild country includes a few thriving lumber towns, visited daily by the lake steamers; but in the interior all the primitive roughness remains. Vast sand tracts covered by scrawny oaks and underbrush are succeeded by hills crested with pine. Then come tangled forests of mixed growths or dense cedar swamps, almost impassable even to the foot of the hardened backwoodsman. You may travel for dozens of miles without seeing a house or other sign of human habitation, and whole counties in some instances contain only a few hundred settlers altogether and not a single village worth the name. Intricate systems of rivers, well stocked with trout and grayling, intersect the wilderness and find their way in crazy crookedness to the great lakes.

A long voyage by skiff down one of these streams for one hundred and fifty miles was recently finished by two of us at Bamfield's on the Au Sable River. For three

days our water journey, with occasional stops for fishing, took us down the boiling current through primeval woods, along swift rapids, and amid scenes so rugged and solitary that all consciousness of civilization was lost, and only the yell of the red Indian and the curling smoke of some distant wigwam was needed to complete the sense of isolation and wildness.

No pen can depict justly the sensation with which one begins thus his first voyage on an unknown stream, without guide or even tent for shelter, in a region far remote from home, and with a fair forecast of peril from rapids, rocks, and snags. With a few strokes of the paddle all traces of mankind are lost to the eye. The whirr of the distant sawmill still strikes the ear, and the puff of the locomotive penetrating the solitude reminds you for half an hour that there is an outer world of human industry. But all else is merged in the solemn silences of a wilderness so dense that the mid-day sun scarcely shines through the trees. Gradually but surely, all sombreness wears away in the charms of isolation, and there succeeds a perfect exultation of loneliness. Now, with paddle laid by, you yield the skiff to the current, to study the surroundings. Below is a stream fit for the drink of the gods. Its waters are like liquid sunshine in clearness and purity. Still farther below is a panorama of endless loveliness of river bottom. Sometimes it shows a reach of white sand rising suddenly almost to the floating keel or sinking to dark depths. Next, as the soil changes, comes a long bed

of many-hued pebbles, rounded by the wearing waters, until one seems drifting over a clean cobble pavement. Then again sweeps into view a floor of long grasses swaying snake-like in the current, or a matted bed of boughs with every twig as clearly outlined as if on the green branches above. The shore, too, has its infinite variety of scenic nature. Dead trees, loaded with parasites, whose foundations have been loosed by the current, bend down till their boughs sweep the waters, or some giant pine, felled by an old storm, bridges the stream from bank to bank. Each crooked turn brings to sight a fresh forest vista, and where the waters expand into still coves there is a momentary glimpse of lily-pads dotted with their great fleecy blossoms. Vision revels in these continuous but ever-changing pictures of nature, and inspiring all is the strange and joyous sense of swift motion without effort or toil. In that earliest fleeting hour of a first canoe voyage in the wilderness, and before the eye is cloyed with nature, are crowded delights which more than repay all the privation or peril of the venture.

The Au Sable is still the most famed for its grayling of all Michigan waters, and investigation of the habits and qualities of the rare fish was the prime object of our arduous trip. The grayling is chiefly found in the upper parts of the stream before the waters reach the log cuttings which sully its pure flood. Those head-waters are like crystal, and even in midsummer cold as ice. The current flows at the rate of six miles an hour. There are

no rocks or waterfalls along its course, but a constant succession of ripples flashing in the sunlight on the surface of waters varying from one to ten feet deep down to the sands below. These sands, in level beds clean as a tidy housewife's floor, stretch often for hundreds of feet. Though the bottoms near to the shore are sometimes lined with ragged sunken trees, these seldom reach to the central river-bed, where the swift current has swept away all obstructions. The quality of the water, tested by the taste, is marvellous. Bursting forth at its sources from large springs, and preserving its coldness and purity for a hundred miles, it can be dipped up and drunk with as keen a relish as a draught from a cool country well; for in some subtle way it seems to have lost that mild vegetable flavor which occasionally takes off the pure edge from the waters of a mountain spring. The grayling, most fastidious of fish, finds in waters like those of the Au Sable a fitting and congenial home. The main river is about fifty feet wide, and very few brooks enter it; nor apparently does the fish ever enter those little tributaries, to the very head-waters of which the nimble trout would be sure to ascend.

Every half mile or so brings to the sight of the floating voyager on the Au Sable an open space in the forest many acres in extent. There are thick, blackened tree-trunks on the ground, protruding in all directions from their shroud of green underbrush. A more unsightly spectacle are the dead pine trees still standing in these

open areas, black around the roots, but reaching, straight as arrows, for a hundred feet in air. These are the gaunt skeletons of what were once splendid living pines, now killed by the forest-fires which periodically sweep through the Michigan woodlands during drought. Not far below the mouth of the Au Sable, and on the other side of Saginaw Bay, is the region where the deadly fires two years ago devastated the woodlands so terribly, causing the loss of hundreds of lives and millions of dollars' worth of property. A well-informed resident of Michigan, who lives but a few miles from the scene of that horror, has described it, not as a burning forest in the ordinary sense, but a cyclone of flame, marked in characters of fire by many of the phenomena of wind tornadoes. In some way the forces generated a powerful volume of air, filled with gases in combustion, and penetrated with almost supernatural heat. It was a sort of earthly counterpart of those tornadoes of fiery gas which astronomers tell us sweep over the incandescent envelope of the sun. Wherever it touched the ground this flaming destroyer consumed. Woods, fences, houses, cattle, and human beings were not merely burned, but almost vaporized. Often the whirlwind left behind a marked track of ruin, with clearly delineated sides. One man would be taken, another a few feet away, left. Half of a line of fence would be destroyed utterly, while the remaining half would not be even scorched. The whirlwind of heat, like a cyclone of wind, sometimes bounded from the

earth only to descend again and lick up the houses and forests. It leaped open fields and rivers in an instant, converting the surface waters into steam, and finally stopped its career of destruction, not because of lack of fuel, but because its strange fiery energy was in some occult way exhausted. As proving its peculiar cyclonic quality, there is a well-authenticated story of a farmer who had left his pantaloons in the middle of a ten-acre lot. In the pockets were five trade dollars, and when he returned after the swift passage of the flaming whirlwind, expecting to find intact the garment so far removed from the blazing woods, he found only a lump of melted silver where he had left the coins. Looking upon the enormous masses of pine trees and vegetation which line the Au Sable, conceiving their inflammable condition during drought, and then glancing anew at the open burned spaces, with their huge charred tree-trunks, one could easily imagine that the stories about those swift floods of fire were neither fanciful nor exaggerated.

By local advice we delayed fishing until some five miles down the Au Sable, and the same distance from a saw-mill whose slabs and dust pollute the stream. Our angling outfit consisted of two light rods, an assortment of flies, ranging from drab to the most brilliant scarlets and yellows, and the box of ground worms which the wise angler never omits when new waters are to be tested. Our voyage began early in the afternoon. Soon the waters became clearer, breaking into larger ripples, and

when the sun was some two hours from the horizon we essayed our maiden casts, using a worm for the leading gut, and two feet back a dun-colored fly, known locally as the "grayling." The necessary mode of fishing on the Au Sable is peculiar. At few places can the stream be fished from the shore without wading, and wading in the deep, icy waters is an acute experience to sportsmen who meditate camping in the open air. So the common method is to catch one of the overhanging trees, to which the stern of the skiff may be fastened, or more often the man behind holds on while the angler at the bow drops line in the long ripples down stream. This latter plan my comrade and myself adopted in these experimental attempts. At almost my first throw there was a gentle pull on the line, and I brought up a chub-shiner, a vulgar species of fish which in these waters bite in the swiftest currents. Then came more chubs. Ripple after ripple I tried with no more substantial rise. At last came a sharp silvery gleam, and a splendid fish leaped in air, just missing the dun fly. Twice again he showed his shining side, then, made wary by failure, sulked at the bottom. A few moments later, while the fly lay carelessly close by the boat's side, there was a sudden twitch, a brief run and struggle, and a grayling, weighing perhaps a quarter of a pound, lay in the boat's bottom. It was not much to show for a half hour's fishing, but 't was a beginning.

In the late afternoon we drew our boat to shore at a point where a smooth, high bank gave a dry bed among

some lofty Norway pines. The poetry of camping out in Michigan woods needs the realities of a warm couch to be effective; and for a warm couch one must have either abundant blankets or a tent, while unluckily we had neither. The scant outfit of each of us was composed of two blankets—one of wool for warmth, the other of rubber as a protection against wet. The horrors of that first night will be indelible in memory. It opened in the usual haze of romance and novelty that tinge an evening in camp. There was the balmy pine-scented air, the gleaming fire, the full moon shining through tall firs, the ripple of the waters, and the more substantial accessory of supper. Then as we lay down on our rubber blankets and drew about us the woollen coverlid came the dismal prose. The mosquitoes charged down in battalions, their bills whetted with acute hunger. The more we folded us in mosquito netting the harder we breathed, and when, half-asphyxiated, we loosened the nets, our cruel foes pounced on us in clouds. But the real woes of the victim of this sort of camping out come later in the night. Spite of the fretful drone of his insect foes and the frequent bite, he at last falls asleep. For a few hours he slumbers soundly. Then dream after dream, each with some frosty, freezing conceit, begin to enter his slumberous consciousness. He is impaled on some Arctic berg or drops headlong into a Niagara of ice-water. One after another these cold phantoms chase through his sleeping fancy. At last, just as he imagines some wild Esquimaux stabbing him with an

icicle, he wakes with the sensation that his vertebral column is strung on cold wire. The moon has sunk toward the West, and a dank fog rests on the river. The air seems wintry, and a keen chill gives the cold a cutting edge. The cold humor runs through every fibre to his inmost marrow. He heaps up the fire into a big blaze. He roasts in front while he freezes behind, and the moment he turns he is frozen where before he roasted. He prances up and down the river bank for an hour or two and thrashes his arms like a maniac, all in vain. Wearied out at last, he rolls himself in his blanket, so close to the flame that the wool is scorched, and thus, with restless slumber filled with shifting dreams of martyrdom at the stake or on icebergs, he works through to daylight. He feels at least the morbid satisfaction that the mosquitoes share his woe, for the sharp cold long before has driven every one of the pests to its lair.

After that chilly night-watch we fell to fishing in the early morning, more as a counter-irritant to the all-pervading cold than from ardor for the sport. Just opposite us was a deep pool where the waters eddied back around the branches of a sunken tree. Still confiding in the killing potency of worm-bait, I dropped the line with short snell and lead sinker just within the log, where the deep current was momentarily stilled. Instantly came an undoubted tug. I struck hard. There was a loud splash, followed by the obstinate struggles of a large

fish beating the water in swirls. With a strong pull—for no delay was possible by the side of a knotted, sunken pine—I landed a yellow perch, weighing a pound or more. Again, with fresh worm, I dropped the hook between two branches of the subaqueous tree, where there was no alternative but an unsportsmanlike "fling" whether fish large or small took hold. Again came a sharp stiffening of the gut, and high in air flew a silvery half-pound grayling. The hook tore out, and the fish, dropping on the steep slope, bounded back to the river in a trice. There were no more bites at that camp-ground, and it began to look as though the sole product of two thousand miles of travel would be the solitary grayling of the day before, whose cost might be estimated in dollars for each grain of fish weight. But better luck was happily in store.

Our traps once more tied in the skiff, we fairly flew down the rapid current. Suddenly the river opened to a width of seventy-five or a hundred feet. Striking a bank the waters whirled backward in a huge eddy, which had cut a round pool fifteen or twenty feet deep in the sands. By a tall pine on the bank we recognized the spot as the "Big Norway," a pool noted for large grayling. No time was wasted. My comrade with fly-rigged tackle took the open shore, while, mooring the skiff, I cast my leaded snell and writhing worm far in the distant eddy. The backward current took it to the exact centre of the deeper pool, just over the sunken branches of another of those water-logged pines which fringe the

sand bottoms of the Au Sable. Suddenly came a quick jerk and that strong throb in the quivering line, which always makes the heart of the angler leap. With a firm stroke I had the fellow hooked, but he rushed straight for the tangled snag. I gave him the butt, and for an instant the curved rod swerved him from his course. No scope here for a sportsman's scruples over catching the first big grayling! So grasping the line I drew in the resisting prey hand over hand for forty feet. The struggle quickly ended, and when nearing the boat he came in as gently as a sulky perch. A splendid grayling he was, weighing a pound and a quarter, with dimpled back and two long black marks along his shining breast. A second, third, and fourth fish followed in a few moments —one a handsome fellow of three quarters of a pound, hooked at a distance from the dangerous snag, and played to his death in the orthodox fashion. Meanwhile my comrade, standing far out on a floating log, had hooked on his fly a half-pounder in the ripples. Here in the more powerful current the grayling was at his best. Time after time he bounded above the surface or struggled below in those semicircular leaps for which the trout in swift waters is famed. In vain my friend tried to drown the fellow by holding his open mouth stiffly against the ripples. At the end of ten minutes the sturdy fish showed no sign of exhaustion, and had to be landed at last in my mate's hat, still struggling fiercely. Our fish when laid side by side made a beautiful display—five

handsome grayling, weighing each from a quarter of a pound up to a pound and a quarter, with sparkling tints and lustrous scales.

This handsome lay-out of grayling, with the variations of color, due to difference of age and size, gave us the long-wished-for opportunity to record the outward marks of the strange fish. The small grayling, of from a quarter to half a pound, is almost an exact counterpart on a small scale of the salmon. It has, however, fine black spots dotting the silvery scales near the gills, and gradually disappearing toward the middle of the body. Its breast is mostly milk-white, but with two faint dusky tracings extending below the pectoral fins. In the older grayling, however, there are decided changes: the silver-gray tint of the side shifts to a faint brown; the dark specks appear only near the gills, and are few in number; the dusky pectoral marks deepen into blackness; and the graceful salmon curve to the back of the smaller fish changes in the larger to a straight slant. The head of the grayling is trout-shaped, but so small that on a pound fish it barely equals that of a six-ounce trout, while the mouth opens with an aperture so narrow as almost to deform the fish. Parallel lines of faint yellow reach down the sides. The eye is luminous and large, reflecting a lovely shade of blue black. The forked tail is of but moderate size, and of rich purple hue. The dorsal fin, particularly on the larger grayling, has an abnormal development. If the mast of an ordinary sail-boat were to be laid on the ground

and the canvas raised in air, the rhomboidal shape of this odd dorsal wing would be pretty clearly outlined. On our largest fish, weighing, as stated, about a pound and a quarter, measurements of this upper fin showed a length of about two inches and a half and a height from the back of two inches and a quarter. The fin is very flexible, and when the fish is poised in the current, sways like a sail; and a row of light-brown spots a little above the dorsal ridge make the wing-like protuberance a very conspicuous object. Half way between the dorsal fin and the tail appears the leathery embryo fin seen upon the trout; and like the trout the grayling has a superficial iridescence, very vivid, on its dark back. The grayling's flesh is almost white, with just a suggestion of salmon tint. When raw it is very solid, making the fish very easy to preserve; and when cooked, in flavor it almost exactly resembles that of the trout. The whole body of the grayling is covered with scales as large as those of the yellow perch of the same size. As the smaller specimens may be likened to the salmon, so the larger resemble the familiar white-fish of the great lakes. Take away the hump of the white-fish's back and the general likeness to a grayling would be well-nigh complete. Indeed, many of the natives of upper Michigan insist that the grayling is a veritable cross between the white-fish and some member of the family of the *Salmonidæ*. Another local assertion, that the grayling cannot ascend waterfalls on account of the resistance of its big dorsal fin, is equally apocryphal.

If local report is trustworthy, the Michigan grayling spawns in the late autumn or early winter, and reaches the best condition in September. He affects smooth or pebbly bottoms, and is to the last degree fastidious as to the purity of the water where he lives and the general cleanliness of his home. The least disturbance of bottoms by logs or the slightest pollution of the stream drives him far away. The neatness of his habits is attested by the total absence of fishy smell when first caught, and in its place is a mild and pleasant odor of violets. Nevertheless he is slippery and as elusive to the grasp as the trout. Flies are the grayling's stock food. Lying close in his sandy lair, he watches the watery surfaces, and rises from down stream to snap up the insects that float with the current. It follows that the most skilful device for capturing the fish is simply to let your gang of artificial flies float downward with slightly relaxed line, so that the fish may hook himself. Outside of insects, however, the grayling has a wide range of appetite. The stomach of one specimen dissected showed me only gray and black flies; but another contained a small eel, three inches long, and the same fish had been caught on a worm, which proved the best bait for grayling of large size. Grasshoppers are also, in their season, a killing bait, and a few baby hoppers which we caught on shore proved singularly effective on the second day of our trip. Out of fifteen grayling caught during about four hours' fishing, five—including the two largest—were taken on angle-worms, six on artificial flies, and four on grasshoppers.

There remains to be noticed another extraordinary quality of the grayling that seems strangely inconsistent with his liking for clean waters—namely, his tenacity of life. During the third day of our fishing experience in the Michigan wilds we caught several grayling, of which two, weighing about a quarter of a pound each, were placed in a pail with not more than a quart of river water. At the end of two hours both were alive, though one, which had previously been left for some minutes on the boat's bottom, gave signs of dying. How much longer his brisk comrade would have survived is doubtful, for the claims of hunger just then vanquished the ardor of the naturalist. The experiment, brief as it was, suggests the ease with which some of our clear Eastern streams might be stocked with the fish. Whether the grayling, however, would associate with the trout of our Eastern waters is doubtful; for it is a singular fact that, though the general habits of the two species are very similar, they are never found together in the same Michigan rivers. Trout, for example, are never caught in the Au Sable, although the streams a few miles farther north teem with them. On a comparison of the two kin fishes the trout must be reckoned the superior, both as to flavor and fight, though in very swift water the grayling, when hooked, seems absolutely tireless, perhaps owing to the smallness of his mouth. But without strong water behind him, the grayling yields to the suasion of rod and reel as easily as the plebeian perch.

During a three-days' water trip for a distance of one hundred and fifty miles, the visible traces of man were scant and at far intervals. Three or four farm-houses, a tented party from Detroit with whom we passed a hospitable hour, and a small lumber camp were the only human signs. Indeed, one of the counties, Oscoda, through which the Au Sable runs, in its whole tract of six hundred square miles, contains, by the last census, less than five hundred inhabitants. It was in this county, after a second night of chilly camping, that we lodged in a typical farm-house of the Michigan wilderness.

To the Eastern eye how rough in its outfit and how pathetic in its lack of comforts is the home of one of those pioneers! The one I have in mind stands close to the brink of the river, so near the waters that the rise of last spring swept up to the door-sills. It is made of logs squared and fitted at the ends, with the long interstices between the timbers closed by wooden wedges and mud work. Two or three rugged out-houses similarly constructed give shelter to the farm cattle. The half-cleared tract of a hundred and sixty acres, taken by the settler under the Homestead Act, is thickly scarred with blackened stumps, between which rise struggling patches of grass or grain. Nearer the dwelling is a scrubby garden covered with a weak growth of carrots, and the whole cleared tract is circled by the ghost-like array of those dead pines which, all over Michigan, record the sweep of the forest-fires. The dismal environment of the settler's

home has its counterpart in the rough walls, the uncarpeted floor, the squalid children chasing each other from corner to corner, the flock of frowsy chickens that enter and go out at will, and, most pathetic of all, the housewife, worn with toil and child-bearing, who, with an infant at breast, pulls wearily through her dreary round of drudgery, In a closet fitted with dirty berths sleep the children. Ascend to the upper story next the roof where the grown people and visitors sleep! The garret, for it is nothing else, runs the whole length and breadth of the structure. In each corner is a rude bed fitted with sheets and coverlids on which seems to have gathered the dirt of ages. On one of these in the open room slept my comrade and myself. In another was the mistress of the manse, whose husband was away in one of the lumber towns; and in a third narrow couch slumbered two hired men. With one exception, the nearest neighbor of this backwoods family was some ten miles away; all supplies had to come from the lake town of Ausable, fifty or sixty miles distant, over sandy roads; and the only visitors were the rude lumbermen or an occasional sportsman from Saginaw or Detroit. Yet, amid all these shadows of poverty, hardship, and squalor, there were some rifts of comfort. Faint glimpses of culture were to be seen in the coarse prints on the walls, the sewing-machine, and some stray efforts at household decoration. The children, though untidy, were red-cheeked, and precocious in speech and observation far beyound their years; and the

temper of the inmates of the rude dwelling reflected the most kindly and generous hospitality. When we found that this backwoods home had been wrested, only two years before, from an unbroken forest, we realized the real dignity and import of those humble frontier beginnings from which the greatness of a nation has sprung.

It was toward the close of our third day on the Au Sable that we struck a school of grayling in a spot that proved clearly the fish's cleanly and fastidious traits. We had passed the north branch of the river, and from a washed bank of clay it had poured into the main stream a roily flood. A quick turn in the river brought us to the mouth of Big Creek, whose clear waters ran for a quarter of a mile down stream before they mixed with the muddy current. Just at the clear edge of the line dividing the two streams the grayling had gathered thickly. Floating along on the dingy central flood and throwing my gang of flies on the crystal surface beyond, I got rise after rise. Next we tried, successfully, the clear side of the stream, holding the boat by the overhanging branches and snapping the flies out to the murky edge. Just where the two streams of purity and pollution finally blended our last grayling was drawn in, the rods laid aside, and the little skiff headed down stream for the long voyage of more than a hundred miles, which ended at Bamfield's, two miles and a half above a log-jam thirty miles long that barred our exit to Lake Huron.

A YANKEE COON-HUNT.

NOT a few people, even among those versed in the lore of woodland and stream, will be amazed to be told that the coon is one of the commonest forest creatures of our Eastern States, and that in New England, when hunted systematically, it may be found as often as the gray squirrel. Yet many a sportsman, who knows every foot of his native township, may trudge for years after fin or feather without seeing a single coon. So uncommonly, indeed, is the animal to be met with in the daytime, that even a glimpse of one usually excites general gossip in a Yankee community, and that is a red-letter day in a sportsman's life which brings the ring-tailed "varmint" to bag.

The reason of this is the seclusive habit of the animal in daylight. Rarely when the sun is up does he leave his hiding-place in some deep cleft of a rocky ledge or the forsaken nest of a squirrel or crow, where, coiled in sleep, he passes the daylight hours. His tameness when occasionally visible in daytime seems in fact, to argue a kind of blindness which prevents his seeking food in sunlight. But with the first darkening his nature and habit change. Then every sense quickens to movement and alertness. In the dusk he leaves his lair to feed, in summer on some

adjacent field of young corn, in autumn on the acorns and chestnuts that fall in the woods. The farmer now and then discovers his cornfield ravaged as if by hungry pigs, the tender blades, half eaten, strewing the ground far and near. Very likely he flings then his rustic epithets at the comparatively innocent woodchuck instead of the litter of young coons that have really done the mischief. Or the observant hunter passing under a chestnut tree in autumn will often see fragments of the nuts with their meats half chewed lying on the dry leaves. If versed in coon-craft, he knows that these are not the remains left by a squirrel after his meal; for the squirrel cleans off the nutshell neatly and eats the meat entire. They are instead the certain sign of the near home of a coon, a quadruped whose teeth are so formed as to foil the nicer economies of nut-eating. It seems a sardonic freak of Nature, who usually does things so fitly, that she exposes by day to the hunter the thrifty squirrel, while she protects by her mantle of darkness the predatory and wanton coon. She even goes further in her injustice, and garnishes the coon with a thick layer of fat, which answers him for food and drink through his torpid winter, until, lean and hungry, the spring-time wakes him out to new venture and a square meal.

But not always has the coon a shroud for iniquity in his native darkness, as a recent night proved, when the writer and a comrade first witnessed a hunt. "A grand night for coons," remarked Hurlburt, the more experienced of

the two hunters, under whose leadership the mysteries of this nocturnal chase were to be explored; and a grand night it was, with every star twinkling in its place, after a week of October rain and cloud. At a little after eight o'clock the two-seated wagon that was to take us to the coon-grounds was drawn out; a black dog, whose potential share in the hunt will be hereafter described, frisked about with joyful whines; a gun, two lighted lanterns, a rope, and a pair of the sharp spurs by which telegraph repairers climb the poles were added. Then, leaving the lights of the hill-top village behind, we descended the steep slope eastward, mounted another incline of equal pitch and greater altitude, turned into a by-road, stabled our horse in a convenient shed, and began our march for the woods a quarter of a mile away. A sinister procession this, that took its way across the fields, with its rope, its blinking lanterns, and its gun, more like a gang of burglars than a party of harmless sportsmen. There were pasture lots to be crossed, fences to be tumbled over, and several swamp-holes to be floundered through before we reached the edge of the forest, where, a few days before, one of our hunters had seen the chestnut crumbs left by some witless coon after his night's meal. These woods were, in a straight line, less than a mile from the village, whose lights almost cast shadows along the sylvan edges; and to three of the party the place was as familiar as our own door-yards, often traversed in boyhood, yet never, in those days, with sight of a coon or suspicion of the animal's presence.

A weird and sombre spectacle it was, as we entered those still forest shades. Below was the brown carpet of rustling autumn leaves. Above were the spectral tree-tops stretching across the stars, except where here and there broken by a forest-glade. The lanterns cast shadows through the underbrush and shone fitfully on the moving forms trampling in Indian file over gully, and rock, and cracking bough. When at intervals we stopped to listen there were significant little sounds that broke the woodland silences. A twig or nut dropped from a tree, or a sudden rasp of the leaves, signalled the retreat to its hole of some squirrel alarmed by the untimely intrusion. The dog's quick tread as he pattered through the brush could be heard at times, now duller with distance or louder as the animal came back to take up some new scent. Once the creature, whose actions were well-nigh human in sagacity, broke into a whine, followed by a series of deep but spasmodic barks. "Jeff don't bark as if he meant business this time," said Hurlburt, "but we 'll go and see." We found Jeff wheeling in uncertain gyrations around a group of trees. But as we drew near his motions became more definite, his yelps died away, and he was off on the fresh scent left by some vagrant coon which perhaps only a few moments before had fled from the tree clump. Now our party separated. The two raw members of it remained behind while the hunters passed on along the dog's track. We waited for ten minutes, when suddenly came again Jeff's deep bass, not as before

in quavers, but strong, steady, and regular—the certain proof that the game was driven to tree. Erelong, too, the joyful call of the hunters confirmed our hope, and, after a wild dash through briers, over ledges, and across a woodland swamp, we stood under the tree up which Jeff had driven his quarry. It was a big maple, thick with boughs and dwarfing the smaller woods that edged the swamp. Looking upward we could descry dimly what seemed a knot on one of the upper boughs, but so vague and immovable that it was hard to fancy it a living creature. One of the hunters took the gun, and standing behind, at his order, I let a dim gleam from the lantern fall athwart the shining barrels. Four times he fired, but only the falling twigs cut by the shot and the sharp echo through the woods came back. It was almost like a shot in space, so deep was the obscurity above, made blacker by the thick maple boughs.

Now opened the second act of the coon-tragedy. Hurlburt, Jeff's master and the leading coon-hunter of the town, buckled on his spurs. Placing his hands lightly on the tree trunk, he mounted it as readily as a flight of stairs, and in two minutes was far aloft in the boughs. "Gosh," came down a voice tremulous with excitement, "if there ain't three coons in this tree!" Then presently: "By thunder, there 's another one too!" Immediately the climber came down to the lowest branches, caught the rope thrown to him by one of the party, mounted once more, and drew up the gun tied to the lower end of the

cord. "Look out, I 'm goin' to let him have it," he yelled, followed by the discharge of the piece. "He 's goin' to tumble," came again from the tree-top, but no coon dropped. Another discharge echoed through the woods, and a dark object dropped crashing through the branches. In the blaze of our lights it took the form of a coon, which, striking on its rump with upright body, bounded two feet in the air like a rubber ball, and on falling back dashed for the underbrush. Now came the exciting episode of a coon-hunt. In a second Jeff had caught the animal by the back, and was whirling like the fly-wheel of an engine, keeping always, so far as might be, the coon's nose at the circumference of the circle. The instant the coon, resisting the centrifugal force, reached backward for a bite, Jeff dropped it, and two heavy blows fell on the creature from my comrades' clubs. Then the dog entered the mêlée again, and the scene was re-enacted, until the coon, yielding to the awful odds, dropped on its side quivering and lifeless. It would be hard to do justice in written words to that scene—the snapping, biting creature, the shouting men, the tumbles over rocks and crackling boughs, the snarling dog whirling in a rotatory fog; dog, men, and coon in a twisted, yelling, yelping medley, set in a rude and rocky piece of ground among thick underbrush, and the whole palely lighted by the lantern's beams.

The last shot had exhausted the stock of cartridges, and three coons still hung on the topmost branches of

the maple. The gun, therefore, which in a coon-hunt is only used to expedite the fall of the animal, was tied to a bough, and Hurlburt began anew his ascent. The doomed creatures above, made desperate by their strait, strove vainly to escape. Out they ran to the farthest twigs of the branches, which bent like willow shoots under the weight; but one by one the coons were shaken down, and the bloody episode already depicted was re-enacted on the ground below. At the end of this butchery there lay side by side four coons, weighing each some fifteen pounds. The game had been bagged within three quarters of an hour, and not more than a mile and a quarter away from a populous Yankee village.

In an hour more another victim was added. This time Jeff's voice sounded from a point a hundred rods away. The dog was at the foot of a chestnut-tree in the thicker woods, its shaft reaching upward forty feet without a twig, while forty feet farther in air was a dark mass on a small limb. This coon made vain attempts to leap to a tree near by, but the small shoot to which the creature hung gave it no fulcrum. At last it dropped eighty feet without a limb to break its fall, bounding up unhurt ready for its fight, which ended like the others. The traps were gathered, the coons distributed and lugged to the wagon, and within three hours after leaving the village we were home again and in our beds.

Coons average about eighteen pounds each in weight.

A young specimen will sometimes go down to ten pounds, while a patriarchal coon will reach twenty-eight or thirty pounds. The coon has a tail ringed in alternate circles of black and light gray, the tints deepening with age. Its fur is gray in color, coarse and thick, and the creature's head is fox-like in contour, sharpening to a nose so sharp and puny as to be almost a deformity. Its mouth, set back below its nasal extremity, is armed with sharp, white teeth, with which, as well as with its keen claws, it fights savagely. Its meat is reputed very delicious, in color and savor much resembling a rich spare-rib; and its pelt, used for lap-robes, fetches in the fur market from fifty cents to a dollar. Some of the creature's habits are unique. If possible, when shaken from a tree, it takes to the water, often diving to escape the dog; and the somewhat rare combination during a hunt of a man-dog-and-coon fight in a pool is said to be a spectacle beyond description. Perhaps the most amazing of all the coon's physical powers is that which enables it to light in an upright position on its buttocks after a fall that of itself would seem fatal to so heavy a creature. But coons are as much at home in a tree as squirrels, and one of those we butchered that night, after falling thirty feet, caught a small branch and once again had to be dislodged. Coons are abundant in New England simply because good coon dogs are scarce. "Jeff," the real hero of the night's bloody epic, is said to be the only well-trained one in the county, and may be described

briefly as an ideal type. He is a cross between a fox-hound and a shepherd-dog—solid, square-limbed, with smooth black fur, a bright clear eye, and a thick neck, on which he bears a small bunch as a memento of an early struggle with a coon. His master first trained him by "setting" him on coons in a cornfield, and his later education is the result of slow development. "Jeff" rarely barks when on the scent of a coon. He runs lightly as a partridge, and suddenly bursting on the feeding animal drives it to the nearest tree. Other dogs, by barking when on the scent, give the coon a long lead that lets it escape either to a rocky chasm or to the hollow tree that is its home. Jeff's master says that he has known the dog to force two coons into an alder bush and keep them there until shaken down. Last year, with Jeff's potent aid, he killed thirty-seven coons, and this season has already brought in twenty; while the stories he tells of astonishing Yankee farmers, by taking coons almost at their doors, form most amusing features of his experience as a hunter.

But when the best is said for it, coon-hunting is a sickening and brutal sport. The angler and ordinary hunter at least give their victim a chance for life; but the wretched coon, once treed, is signed, sealed, and delivered to his foes. That night's experience, exciting though it was as a novelty, was not one that a sportsman with pity in his nature would care to repeat, and its spirit can be renewed at any time by a brief visit to the shambles.

LOGGING IN MICHIGAN WILDS.

FOR some twenty-five miles above Bamfield's on the Au Sable, the erratic stream, everywhere swift, accelerates its strong current. So rapidly does it sweep that, using oars and paddle, my comrade and myself sped over the whole twenty-five miles in two and a half hours. Just at the head of the reach of rapids stands the Scott and Lewis lumber-camp, where, at the coming of a thunder-storm in the thickening twilight, we took refuge. The kindly lumbermen received us with rough but friendly hospitality; we slept for the night in one of their berths, shared their morning and evening meals, and saw in epitome the routine of their life in the woods. Incidentally also, we heard from their lips the story of their winter toil, expressed so vividly in their free and picturesque phrases that one could scarcely have got a clearer idea of it by actual living in their snowy winter camps. Much that pertains to lumbering has changed since the old time: new processes for handling the logs, improved saws, better discipline, and a dozen labor-saving devices have superseded former methods, until now a modern factory is not further ahead of its predecessors of half a century ago than is the new system of logging in advance of the crude, old-fashioned work with axe and chain.

Lumbering in Michigan, now the great American centre of the industry, is a complex business needing brains and abundant capital. Usually the owners of some great saw-mill on the Saginaw or some other Michigan river have title to forests of pine covering many square miles. They unite with their mill the business of getting out the lumber from the woods, establishing the camps, supplying them with provisions, and attending to the thousand expensive details of two lines of industry radically distinct. The camps in the woods contain from thirty to two hundred men each, and the one on the Au Sable to which I have referred may be cited as a type of all. It is a little clump of rude buildings, hewn directly from the primitive forest, each structure of the log-hut order. The long trees when cut down are sawed to the needed lengths. Then the ends are squared by the axe and fitted to each other tier above tier. The larger interstices are filled with wooden wedges, the smaller with clay. The roofs are covered with light logs thatched above with hemlock-bark, and a few sawed timbers supply the flooring and internal fittings. At one end of the camp is placed the largest structure, used for a stable, in which the powerful teams of hardy horses inured to winter hauling are bedded and fed. In an adjacent log-building, fitted with tiers of berths and with a huge stove as a centre-piece, sleep the workmen. A little farther away is a third building, where on benches along a primitive table the log-men eat their meals, which are cooked in the same

structure. The quickness with which a gang of skilled backwoodsmen will construct one of these camps and equip it for the winter is well-nigh incredible. Often two or three days suffice, and in the Scott and Lewis camp we were shown a tight, comfortable stable, thirty-five feet square, twenty-five feet high to the ridge pole, with an upper story for hay, all put up by the hardy log-men in a day and a half. As a rule, the camps, when the logs are to be driven down stream, are placed near the river bank; but much of the wholesale logging of Michigan in these later times is done along lines of temporary railroad, which penetrate to regions distant from those river forests which were the first to receive the onset of the great industry. Except, however, in the method of finally transferring the logs to the saw-mills, railroad and river lumbering are substantially the same.

The road through the underbrush winds perhaps for a mile to a mile and a half away from the river's bank into the thicker woods where the white pine attains its greatest altitude and diameter. This is no pigmy forest, like those of our Eastern States, into which the Michigan lumberman first enters, but a magnificent ocean of pines, thirty or forty to the acre, two feet in diameter, usually straight as a plumb-line, and with their evergreen crests a clear hundred feet above the ground. Working in gangs of two or three, the log-men approach one of these forest titans. With skilled eyes they scan it, detecting instantly the least variation from the perpendicular or any in-

equality of weight in the branches, the lowest of which is seventy feet in air. Next, one of the gang with the axe cuts a small gash, maybe three inches deep, on the side toward which the tree is to fall. Then two, working a cross-cut saw, assail the sylvan monarch on the bark opposite the gash. If the tree "binds" the saw, as happens but rarely, a wedge driven in the cut gives relief, and presently the huge tree topples and falls to a nicety in the direction desired. The comparatively small branches are trimmed away, and the trunk cut by the saw to the requisite lengths. If long timber is needed, it is severed perhaps twice, but usually the lengths run from ten to fifteen feet, and rarely or never are they cut above the point where the trunk narrows to ten inches diameter. Then comes the hardest labor of all. Reaching into the forest is a long double row of "skids," a sort of log railroad with one end terminated by the roadway, the other ending in two tree-trunks tapering to their smaller extremities so that the logs may be rolled upon them more easily. Seizing the great log with his "pevy" —a stout handle ending in a pike and fitted at the side with a sharp bent hook that looks like the half of an ice dealer's tongs—the lumberman hoists the log on the skid and rapidly rolls it over and over to the main roadway. There the stout horses, with ropes and big nippers, fasten on to the end, and the log is drawn to the river bank, where, branded half-a-dozen times at the end with the marks of the owners, it is either dragged on the ice or left

on the bank to be rolled in the water later for its spring voyage. This prompt and easy transportation of the log to the river bank is of the first importance in profitable lumbering. Usually, after a deep snow-fall, it is facilitated by an ingenious expedient: A tank, some fifteen feet long, four feet deep, and five feet wide, is built and mounted on runners. Just as the sun goes down and the cold night approaches, the tank is filled with river water, a set of plugs withdrawn, and the cistern is pulled slowly over the mile-long roadway. Next morning, where before was obstructive snow, is a broad pathway of solid ice, over which the logs can be drawn at a trot as easily as upon the frozen surface of a lake.

The breezy orators of the West, who have soared so often to peaks of hyperbole with the "ringing axe of the woodman" for a figure of speech, must hereafter either falsify the facts or mourn a lost metaphor. As the king-implement of lumber-craft the axe has been long supplanted by the costly but infinitely more efficient saw. It may be asserted, indeed, that the perfection as a cutter which the saw has reached has fairly revolutionized the whole industry of lumbering. The saws in Michigan, where lumber leads the van of products, vary widely in shapes and sizes. There is the gang saw of the mill, with its thirty upright blades, cutting four big logs at once into boards in less than three minutes, and requiring immense steam-power; the chisel buzz saw, six feet in diameter, costing some $300, that slabs

a log fifteen feet long in two or three seconds with its movable teeth; saws for cutting slantwise; changeable saws, working on curves, for shaping barrel staves; saws that slant the edges of barrel heads; saws with reverse action for the thick and thin edges of shingles; and a host of other saws with too many names and motions to be described in detail here. But the saw most used in the woods at first glance seems of the most ordinary cross-cut order, like that used for a thick log in an Eastern wood-yard. Examine it, however, more closely, and you will find that the teeth, instead of being bent in the old style, are widened at the apex so as to avoid clogging; it is, moreover, only every other tooth that cuts, for between each pair is a bifurcation at the end of a square shoulder that, as the saw moves, cleans away the dust, allowing each tooth to play freely against the uncut wood; while the saw itself is made of steel so beautifully tempered that the workmen bend it without injury into a double coil, like a Damascene sword-blade. The wonders in cutting accomplished by this improved flexible saw in the hands of the skilled Michigan woodsmen almost pass conception. Working on a test two men have felled in ten minutes ten pines, each of them two feet in diameter; and where a gang of three men used to consider ninety logs a large day's work, two hundred logs a day are now regarded as nothing unusual. As may be imagined, the good condition of the saw is of prime moment, and perhaps the best-paid man in a

lumber-mill or camp is he who repairs the broken teeth and keeps the saw in good temper; while a broken pike-head left in a log often causes most costly damage, particularly after the rough timber reaches the mill. They tell a very credible story of a revengeful backwoods farmer—or "tenderfoot," as they most unfittingly call a farmer of the kind in the Michigan country—who, in his ire over some wrong, spiked the logs of his capitalist foes and made them immense loss in broken saws after the timber had reached the mills.

The axes used in the Michigan woods seem to be lighter than those of the Eastern wood-chopper, but fitted with a longer helve. The skill in chopping of the Michigan woodsman in these days of the triumphant saw is not very marked. A queer, double-edged axe much in vogue is hung on a helve at the centre. One blade is thin, the other thick, used respectively for chopping and splitting.

The human product of this remote, isolated existence, with its strenuous work its rough fare, and its rigid discipline under the iron rule of the foreman of the camp, is a strange sort of being. In physique the lumberman is generally a tremendous fellow, with mighty thews, deep shoulders, and a body whose every sinew above the waist has been thickened by incessant toil. A good many, too, particularly those of Scotch birth or extraction, have classic profiles and lofty foreheads that belie their untutored intellects. But one may search far before he finds a set of men, as a whole, whose external traits are more rad-

ically vicious. Almost every man drinks when he has the chance, nearly all are licentious, and for redundant and voluble profanity they vie with the mates of the Mississippi boats. Their swearing is perfectly comic in its range and freedom. All emphasis is lost in the torrent of oaths, and the profane tongue so interlards ordinary talk as to obstruct sense and cause a most lamentable waste of colloquial energy. When, after their four or five months of winter labor, these big fellows are paid off and go down with full pockets to Bay City or some other lake town, they change a peaceful community into a wild pandemonium. Like sailor Jack after a voyage, their hard-earned dollars melt away in the vilest orgies, and a few days finds them penniless and with sunken cheeks seeking a job among the booms or saw-mills. In these terrible spells, coming once or twice a year, the strongest constitutions are sapped, and the local proverb, "Smell pine without whiskey, in old age you 'll be frisky," is rarely realized. Yet underlying all the lumberman's callousness and laxity of morals, there are some substantial traits. He is good-tempered, spite of his prolific and aimless profanity; generous and hospitable beyond his means; in camp, at least, he is said to be honest; and he submits to discipline and bends to his yoke of toil with cheerful composure. That yoke is certainly a rasping and heavy one: all day long during the short cycles of winter he must labor from sunrise to nightfall, often in peril from the falling tree or ill-balanced log; he must put up with a pabulum of which

boiled potatoes, salt ham, and astringent pork are the foremost luxuries; he has to separate himself from all civilized life and fall back for his diversions on the rude amusements and coarse yarns of the camp; and all this he must endure for thirty dollars a month and board, under a foreman whose powers within the pale of the camp are absolutely despotic.

They tell some good local stories to illustrate the character of the lumberman. One runs as follows: Some years ago in the autumn a steamer was on its voyage up Lake Huron with a gang of lumbermen on board bound to their winter camp. On board also there happened to be a Methodist exhorter. Many of the rough woodsmen who had served in the Civil War beguiled the lazy moments with stories of the field and march under Grant, Sherman, or Sheridan. At last the exhorter, seeing what seemed a chance for an evangelical stroke, stood up ostentatiously and said: "I too have been a soldier." "What part of the country," queried a rough lumberman, "did you serve in, sir? Was yer in Virginia or on the Mississippi?" "I," replied the exhorter, "have served in no army of bayonets, but in the hosts of the Lord." "Waal," answered the log-man, "mister, ain't yer a good ways from camp up here?"

An incident equally characteristic of the lumberman came partly under my own observation at Bamfield's, during our brief stay. Bamfield's is a rude farm-house where many of the river-men sojourn during their work

of driving logs. In the dining-room is hung an effulgent poster sent out by some religious society, representing the Scriptural incident of the deluge. The ark is moored to the strand on a yeasty expanse of sea; in the background rises an ancient city, with its vaulting towers and battlements; in the foreground Noah, in flowing garb, is portrayed leading to the ark the procession of paired brutes who, docile as lambs, reach two by two in a long train to the distant horizon. The whole picture is gotten up in most gorgeous hues, and luminous with all the tints of the rainbow. A big lumberman entered the room. He gazed for a while upon the picture, then remarked innocently: "When 's the circus and where 's it a-goin' to be?"

Taking the host of logs down the river in a "drive" is the most picturesque as well as most perilous experience of the lumberman's lot. Tumbled in the head-waters from the bank or kept back by booms from descending with the ice, the logs fill the stream four or five deep for several miles. Finally the booms are loosed and the long column moves. The effect of the great mass in motion is indescribably grand. The whole river takes on the likeness of a writhing snake. Some logs forced upward from below stand for a moment on end, then fall over with a crash; others are shot up on shore to remain "hung up" till the next flood. Anon perhaps the whole mass at some corner of the stream jams in a long chaotic procession, reaching as far up stream

as one can see. The half-dozen or more drivers who pilot the log flotilla are men whose lives have been passed in their dangerous calling, gifted with wonderful sureness of foot and quickness of hand. With their spiked boots they run about as freely on the moving mass as men on common ground. Their pevies and pike poles are in use every instant, here to start a stranded wood giant, there to snatch out a recusant log that threatens a jam, everywhere to keep the surging, ponderous, sinuous snake moving down and onward. When at last comes the inevitable jam, the river driver's skill is put to its supremest test. With an unerring skill that smacks of instinct, his eye detects the "key" log that holds the drive in check. Without fear he essays the dangerous feat of snatching away this key, nor, with all his quickness, does he always escape the thundering mass that rushes down when the key is loosed. These river-drivers, who are a class by themselves, get while at work two dollars and a half a day and board—a slight enough compensation for the terrible peril and the worse exposure to icy waters which brings the large majority to rheumatic complaints and an early grave. At the mouth of the river, after a journey of several weeks, during which the drivers either camp on shore or seek shelter in the occasional farm-houses, the log procession reaches its destination. The logs are sorted out by their marks, "rafted" into long rows held together by ropes, and towed to the great mills to be sawed.

The next stage of the saw log's history must take us to one of those great timber emporia of Michigan that lie on the lower waters of a lumber stream. Of these none surpasses or, indeed, rivals Saginaw, on the river of the same name, some twenty miles above its mouth. For sixteen miles down to Bay City, near Lake Huron, the stream flows between wooden strands. Vision strains itself in vain to see beyond the lumber horizon that stretches east and west. The yellow waters, perhaps two hundred feet wide, pass first between continuous booms, each enclosing its army of giant logs. These booms reach far above Saginaw, and if we include tributaries of the river and count both sides, make up a line of log posts seventy-five miles long. Next to the logs and on the bank proper rise, most impressive of all, the tracts of sawn lumber. Pile on pile they loom up on either side for sixteen miles up and down the stream, covering acre after acre until the wooden monotony becomes oppressive. Now and then the timber strand becomes thinner only to rise again to more imposing height and width around a new cluster of mills. These mills, often of grand proportions, spring from their lumber heaps as a lofty giant of story looms amid the disintegrated bones of his victims. Their tall iron chimneys belch black smoke, the rattling saws cut the air with their distant hum, and the sense of industrial activeness is filled out by the hives of workmen swarming over the lumber hills and loading them, by slow but steady toil, into barges whose hulls rival the capacity of a

Cunarder. Along this stretch of sixteen miles of the Saginaw River there are sawed annually into timber a billion feet of lumber, and last year the figures went fifty millions higher than that amount. Since to most readers these figures are a vague immensity of numbers, let us try to simplify them by an illustration. A foot of lumber, the unit of board measure, means a board one foot square and one inch thick; so that, for example, a plank two inches thick, one foot wide, and ten feet long would contain twenty lumber feet. Now apply the measure to the figures of the annual Saginaw lumber product as cited above. We shall find that the Saginaw mills turn out each year so much lumber, large and small, that if it were all cut in inch-thick boards, each of them one foot wide, and then these boards were placed end to end, they would reach about 200,000 miles, or eight times around our planet. The product, to put the illustration a little differently, would supply lumber enough for a fence four times around the world, made of solid wooden posts and with a double row of boards each six inches wide. More roughly it may be calculated that the yearly Saginaw lumber product in logs floating closely together would cover a water area of considerably more than four square miles.

The coves of the Saginaw—called locally "bayous," a term borrowed from the lower Mississippi—are specially adapted for the gathering and organization of these log armies. The military metaphor, indeed, has peculiar fitness here, for the logs are mustered side by side in

companies held together by a rope fastened to each log by a device not unlike the domestic clothes-pin. As the logs down stream are worked up by the tireless mills, these upper booms are drawn upon for more, until the freezing river finds them quite empty, and another winter comes on to yield its fresh supply.

But the saw log's story becomes most dramatic as it nears the mill and, loosed from the restraining rope, is steered into the glade of open water that leads up to the wooden slide. If we enter now the great lumber-mill, we shall be in at the saw log's death. Down the slide on a wooden railroad runs a heavy truck, fitted with two cross lines of heavy iron teeth. With a plunge it dashes below the water, still holding its place on the rails. Then three giant logs are floated above it. At a signal the steam is let on, the machinery reversed, the strong chain holding the truck tightens, and the truck itself begins to ascend. The sharp teeth catch the logs, which, in a trice, are lifted dripping from the water, whisked up like twigs a hundred feet to the mill, and rolled off opposite the first set of saws. These saws are two in number: one set below is of the buzz variety, perhaps six feet in diameter, and cutting therefore through a three-foot log; but as this semi-diameter is often insufficient for a big log, a second and smaller "buzz," placed above and in front of the first, cuts the slice, which otherwise might still hold fast the slab. One of the largest logs weighs a number of tons, and human strength alone

would never suffice to turn it after one of its sides has been "slabbed." Just here comes in a beautiful piece of powerful mechanism. At the touch of a lever a stout beam, armed with iron teeth, rises by the forest giant's side. It snatches the wood, and in less time than words can tell it the log is tumbled over, and the framework, rushing back and forth with amazing speed, has driven the edges of the tree athwart the saws, until the once rough stick comes forth a symmetrical square. Then, in another instant it is shifted before the "gang," a set of ordinary upright saws placed an inch apart, and often with thirty or even thirty-five blades. Below, an ordinary circular planer revolves in front of the gang and smooths the lower edges of the boards. The immense piece of timber is run through in a few moments, and what was five minutes before a rough tree-trunk has passed into the inch boards of commerce. Nor does the work end here; for the slabs are passed to a new machine, which seizes them as with a living being's grasp, and whatever part of them can be made so become laths. Other machines take the harder woods, ash, elm, or oak, and convert them with equal speed into staves, barrel heads, or shingles; and finally the otherwise useless débris passes to the furnaces to feed the fires of the engine. There is seen little or no sawdust around the Saginaw lumber-mills, for the reason that it is all fed automatically to furnace flames; and, in general, the cycle of utilities by which one branch of the great industry is made to feed

or supplement another seems as rounded as human ingenuity can make it.

Sometimes, particularly in the more modern mills, the routine as described is varied by lifting the logs from the river on an endless chain; and a number of minor mechanisms fill out the devices by which the lumber is cut and distributed. One ingenious machine, working double emery wheels, sharpens the buzz saws on both sides of the teeth during a single revolution of the saw's disk, and requires no attention beyond simply the fastening of the saw upon it and the unfastening after the work is done. Another flattens out, by a clever mechanical expedient, the teeth of the saw so as to cut a wider rent and prevent clogging as the cut becomes deeper. Moreover, a system of elevated railroads takes the lumber-laden trucks and distributes the boards at the points in the yard or on the wharf whence they are to be shipped.

The present size and swift growth of the lumber industry of Michigan, as shown by statistics, are almost startling. Twenty years ago a few hundred million feet of lumber were cut in the State; now the annual product is one quarter that of our whole country, and reaches more than four billion feet. Cut in boards, twelve inches wide and one inch thick, the yearly product would reach eight hundred thousand miles, and would suffice for a double-boarded fence, with posts, sixteen times around the earth. It would build houses for a city of a million inhabitants, and would each year load some twenty-five hundred miles of railroad

cars. Those who were far-sighted enough to buy Michigan lumber-lands a quarter-century ago at a little more than the Government price of a dollar and a quarter an acre, have already made colossal fortunes out of tracts which sell readily now at from fifteen to twenty dollars an acre. Nevertheless, the business has its ups and downs, and is particularly down when a great forest-fire sweeps over a lumber region. In that event, unless the trees are cut within a year, a worm penetrates the timber, spoiling it in a few months. One of the curious facts in this connection is the almost immediate appearance by millions of the moth that hatches the worm on a burned tract of perhaps ten thousand acres, where before not a moth of the species was visible. Equally surprising is the circumstance, that after the pine has been cut away on an immense tract there spring up all over it poplar trees where before not a sign of the poplar could be seen—the seeds of the new growth, no doubt, wafted invisibly from a distance through the air and finding fertile lodgment on the uncovered soil. The value of the lumber, when marketed, may be judged from the fact that an ordinary pine makes some two thousand feet of cut boards, worth at the mills, say forty dollars, while the biggest pines produce five thousand feet, worth one hundred dollars. As showing the size to which the white pine sometimes attains, the lumbermen tell of a sound tree in northern Michigan, eleven feet in diameter at the ground. The owner of this splendid shaft has already refused one hun-

dred dollars for sixteen linear feet of the butt, which was sought for exhibition. But, unhappily, all these evidences of Michigan's vast wealth in lumber are only the signals of the end. Some ten years more, at the present rate of denudation, will exhaust the grand pine forests of the State, and unless the cutting of harder woods, cedar, maple, and elm, succeeds, large amounts of invested capital must seek new fields. Nevertheless Michigan, with an area so great that the distance from Detroit to the northern end equals the distance from the same city to New York; with a yearly product in crude iron exceeding that of any State in the Union; with a salt product greater than that of all the rest of the United States, and an output of copper only rivalled in the whole world by Chili,—with so great natural elements of wealth as these the great State, even though it loses its present foremost rank as an American lumber mart, may yet count its coming centuries of continuous and abundant prosperity.

THE FATHER OF WATERS.

THE Eastern resident who for the first time sees the Mississippi at Memphis in a dry season is certain to be keenly disappointed. From early boyhood up to the days of his maturity, he has always thought of the stream as something vast and indefinable, dwarfing all other American rivers as Niagara dwarfs waterfalls. The dark, crooked line which his callow finger first traced out, bisecting his school-boy map, has lost none of its ideal bigness when he hears of it in later life as a great artery of trade, and reads of the havoc wrought by the great river in its angry moods of overflow. But he travels to Memphis; he goes down one of the westward streets of the city twice within a few years smitten with pestilence, but whose busy thoroughfares bear witness to the abiding vitality of trade; he passes the levee, and descending a long incline of cobble-paved strand, the Father of Waters is at his feet. The transition from the river of imagination to the river of fact is abrupt and harsh. The stream before him is not broader than the Hudson off the northern end of Manhattan Island, and at places below Memphis it narrows until seemingly not more than a third of a mile in width. Its muddy, opaque waters

detract alike from its romance and its suggestion of depth, while a long barren island of sand in the centre of the stream makes the river seem both narrower and shallower than it really is. Beyond rises the dreary level of the Arkansas shore lined with timber, varied here and there by a clearing and a weather-beaten log-hut. The only thing to break the disappointment at this first view of the river during drought is the roar of trade on the Memphis strand, the piles of goods, the teeming wharf boats and the steam-boats puffing their impatience of the restraining ropes.

This is the stream in a dry season. How different its aspect when the vernal rains have filled the banks to overflowing! In no respect is the river so grand and strange as in the enormous range between its high and low waters. Travelling down its current by boat one sees a dark line distinctly marked on the tree-trunks. This line, six feet from the roots, while the foot of the tree stands on the top of a steep bank twenty or twenty-five feet above low-water, registers the high-water mark which the river reaches each spring. During the winter the Mississippi is comparatively low, and above St. Louis it is closed by ice. Then come the warm spring rains. The muddy waters rise, burst their icy fetters, and sweep the huge ice-cakes down to melt in the warm suns of the lower waters. Still the stream keeps on growing. The snow-fed tributaries of its upper waters, and the swelling floods of the Ohio and Missouri,

forbid a pause. The water creeps up inch by inch, one foot, ten feet, thirty feet. It is over its banks, pouring six feet through the woods of Arkansas, filling up the bayous and basins far back of its natural bounds. Where before was a river with well-defined banks is now a vast turbid lake from three to eighty miles broad, covered with drift-wood, and, where it breaks a levee, carrying devastation over whole counties of rich cotton and sugar land.

Wherever the current slackens, the river, whether high or low, drops the all-pervasive mud and builds up a bank; on the other hand, wherever the strong current strikes a bank there it begins to cut, undermine, and carry away the soil. All along the river's course these two processes can be watched—on the one side always the shallow, sloping bank indicating a filling up; on the other the steep, crumbling slope which the water is cutting away. The stories, well substantiated, of the power of the river current when turned fairly against one of its banks strain our credulity. A hundred acres of heavily wooded land will often be swept away in a few years. The water, thirty feet deep at a distance of a few yards from the shore, will undermine at times one or two acres of woodland, which suddenly fall in, trees and all, and sink below the surface. It is no uncommon sight to see a tree-trunk sixty feet long, whose foundations have been cut away from the solid soil, fall roots first and, drawn down into the vortex

by the still adhering mass of earth, sink perpendicularly out of sight. The effect produced along the steep banks of the river by this incessant wreck and disintegration of forests is most weird and sombre. Here a vast trunk tangled with débris lies slanting across the river bank; there the river has sapped a young grove of cotton-wood trees which have sunk in a mass, but still cling upright in their native soil, their green tops projecting through the water; elsewhere, it may be, are half a dozen great trees slanting upward from the river bottom, where their roots still hold, sagging and sobbing in the current. But more unique shapes show the geological changes wrought by the river's swift waters. No matter where the Mississippi cuts its way, the bank shows the strata of mud and dirt left by successive floods, proving that the river once flowed there. Back from the banks from two to ten miles on either side are a series of lakes stretching down into Arkansas, Mississippi, and Louisiana. These lakes, sometimes twenty miles long, are invariably shaped like a horseshoe, resembling the famous "Ox-bow" of the Connecticut River below Northampton, in Massachusetts. They are old bends of the Mississippi cut off in prehistoric times, when the river burst through a narrow neck of land, and left his old bed for a new course. The "horseshoe" lakes abound in varieties of edible fish and many water-fowl. Among the latter the cormorants, worthless as food, deserve mention for their

sagacious organization of fishing expeditions. Beginning in deep water, thousands of them form a semicircular line a mile long. At a given signal the birds begin to beat the water with feet and wings, driving the minnows and other small fish to shallow water. Gradually the long line converges, and the fish, beaten together in shoals, become easy prey for the bird fishers.

The horseshoe lakes must not be passed by without allusion to their peculiar fish life. Among their finny species is one that, in marking and shape, is almost the exact counterpart of the striped bass of our Northern salt waters. These Southern fish, however, have a thicker body, and live in fresh water through the year. They weigh from half a pound to five pounds each, and in the spring, when gathered in schools they dimple the surface of the lakes and bayous, they give the angler rare sport. Another fish in the horseshoe lakes much resembling our Northern black bass is dubbed "trout" by the natives. It differs from the Northern black bass in the lighter tint of its sides, its higher quality as food, its smaller head, and never, like its gamesome Northern relative, does it break water when hooked. But the veritable fishy curiosity of the horseshoe lakes is the "alligator gar," or "gar," as it is locally called for brevity. The gar sometimes reaches a weight of two hundred pounds. It has the head of the alligator mounted on the mailed body of the sturgeon. It is the shark of the lakes, feared even by human bathers, and feeding on ducks or water animals, and not infre-

quently snapping away the string of fish which the angler is cooling in the water by his boat's side. Fishing for gar involves some original angling methods. The outfit consists of half-a-dozen bamboo rods tightly bound together, a colossal wooden reel, a cord matching a clothes-line in diameter and strength, and a hook three inches across the curve, welded from an iron rod. The fisherman in his anchored boat tosses over this shark hook covered with a junk of meat or a two-pound fish. The gar seizes the bait with a tug like an ox. If hooked—which happens seldom, for the gar's mouth is bony and hard—the fisherman elevates his mighty pole to an angle of forty degrees, plants his foot against the butt, hoists anchor, and lets the gar haul the boat over the lake for half an hour, after which the exhausted captive is drawn in and speared. The gar is useless for food, and is only taken now and then for sport.

To the eye which is used to the trim and shapely steamers of our Eastern waters the Mississippi boats seem curious and clumsy craft. Let us take, as a fair specimen of them all, the Providence, a boat upon which the writer lately finished a river trip of five hundred miles. She belongs to the Anchor Line of St. Louis, a corporation by far the largest of the river transportation companies, owning twenty big boats plying to Memphis, Vicksburg, and New Orleans. The corporation is the monopoly of the river, fixing its own rates and twisting chance competitors with an iron hand. The Providence, which we are describing as a typical Mississippi boat, is some two

hundred and eighty feet long, with perhaps fifty feet beam. Her lower deck, when loaded, sinks within a few inches of the water. Above is a many-windowed structure looking like a section of army barracks. Half-way up is the saloon, used also for dining, lined with state-rooms and fitted with that prime necessity of river life, a bar. In front of the saloon is a large observation deck, and behind is a cabin handsomely fitted up for lady travellers. Above, still, is the hurricane deck, surmounted by the pilot-house and two lofty smoke-stacks profusely ornamented with iron filagree work or scalloping and their black mouths opening outward in the shape of a huge sun-flower. On the immense breadth of the lower deck is stowed the freight. Here also are the great high-pressure engines that have to be used to force the boat against the swift Mississippi current. The craft is of some fourteen hundred tons burthen, and draws, when loaded to the guards, only about six feet of water; for in the dry season the river, though in its narrowest bends two hundred feet in depth, expands at places to shallows two miles wide and not more than seven feet deep in mid-channel. A singularly queer effect is given to these river boats by a modern innovation superseding the old gang-planks which used to be run out by hand. At the front of the craft on each side is hung slantwise in air by a movable derrick a broad gang-plank, fifty feet long, worked by steam. These two planks or, more correctly speaking, long platforms give the boat the likeness of a

June bug seeking its prey. If the reader can imagine Noah's Ark diminished in size, mounted on a white mud-scow, and fitted with steam-pipes and the antennæ referred to, he can get a fair idea of the artistic and nautical deformities of the Mississippi steam-boat. But the craft makes fast time—sometimes, with the strong current, thirty miles an hour,—is commodious for freight, convenient for passengers, and its officers are courteous and obliging. The passenger is allowed the largest liberties on board, and can go on the hurricane deck or even into the pilot-house unrebuked and unforbidden.

Perhaps the most picturesque character of the Mississippi boat is the pilot. He is no longer the rough and forbidding personage of early years, but a uniformed officer, trim and gentlemanly. The test which he has to pass before he can take charge of a boat is a severe one. He must serve three years without pay as an apprentice, staying in the wheel-house night and day; for hundreds of miles he must know every sand-bank in the stream, every clump of trees on the bank, every change in the depth of water. When he finally gets his certificate after a rigid examination before a board of old pilots, his knowledge of the ins and outs of the great river seems superhuman. On the darkest night he can trace the forest line of the monotonous shore; he knows by a peculiar foamy appearance that the river is rising, and by still more occult signs that it is falling; he reads the muddy, boiling surface like a book, and by the size and

shape of the vortices tells the depth of water below. Two pilots on each boat serve at intervals of four hours each, and the steamer is rarely weather-bound except by a thick fog.

The old rough life of the Mississippi steam-boat has, within a few years, been softened into the habit and routine of civilization. The red-hot boat-racing and gambling days are almost departed. A quiet test of two boats, each under a moderate and equal pressure of steam, or a genteel game of "pedro for drinks" in the saloon, is all that remains on the regular passenger boats of the rough and ruffianly past. But on the smaller craft plying their short trips between near river points, the typical card-player may still be seen piling up his ivory counters —to be redeemed at the bar,—and, with the face of a sphynx, studying his poker-hand within an inch of his ruddy nose. On the Providence is a single memento of boat-racing—a pair of gilded stag's horns hung over the engine, with the legend: "From Columbus to Cairo in one hour and thirty-five minutes. Beat it and take the horns." The distance referred to is twenty-five miles, and the Providence made it against a strong current.

The journey from St. Louis to Vicksburg or New Orleans can now be made on the Mississippi steamer as respectably as on a Sound boat to Boston. One meets odd characters, of course. On the lower deck is a medley of emigrants, gypsies, poor whites, and negroes, and even on the saloon deck are found not a few whose chronic

prejudice runs in favor of dirt and against shirt collars. Nevertheless, even these low whites have an innate courtesy which one misses from the same class in the East or in the West. Besides the inner life of the boat there are many external features of a Mississippi voyage to amuse and instruct. On the shores above the banks there is little variation. The river overflows them every year, preventing all cultivation, so that the land is given up to long reaches of dreary timber; but the banks, with their wild gulches, their broken tree-trunks, their gnarled and twisted roots and masses of woody débris, make up a weird and changing spectacle that never tires the eye. On the river singular craft are continually met—now a Federal Survey boat, anon a floating photograph gallery, or, it may be, one of the vast stern-wheel cotton-boats, with six or seven thousand bales on board piled up to the smoke-stacks, and the whole looking like a huge fortress on the water. The landings, so-called, are no landings at all—only a place where the boat runs aground against the high bank, without wharf or even pathway. A little clearing and a rough padlocked hut for a storehouse alone mark the place. The big boat signals her coming with a double-bass whistle. A solitary biped on mule or horseback appears from the woods and unlocks the hut. The steamer, if bound downward, turns upstream, runs her nose against the bank, swings out, by steam, one of her antennæ, the colored roustabouts land a lot of freight, a bell rings, and again we are off. At

night all this is done by the aid of an electric light and reflector, worked from the pilot-house, which shed a lurid and fantastic glare along the shore. The green light, and the deck-hands, burdens on shoulder, wending their way up the plank, reproduce most vividly the theatrical scene in "Rip Van Winkle," when the goblins come upon the poor wanderer in the Catskills.

At the time these lines are penned the great stream from St. Louis down is at a stage of uncommonly low water. Where the river in flood-time is forty or fifty feet deep, it is now scarcely navigable for craft drawing six feet. Below as well as above Memphis, steamers with cargoes on board worth hundreds of thousands of dollars are constantly stranding, and are only pulled off at much cost and delay. Perversely, too, this low period of the waters comes annually just when the cotton crops are moved and when river trade is brisk with the New Orleans merchants, to whom the bulk of the staple in the Mississippi and tributary valleys is consigned. It is but natural that at such a juncture everybody in the valley should be discussing the improvement of the river for navigation, the new Government works, the efficiency of the levees, the possibility of saving "washed" banks, and the effects of diverting the river current. The writer has talked fully on all these points with river pilots, captains of the steam-boats, planters, and civil engineers actually employed on the levee works. The diversity of opinion among them is simply astounding. Some oppose any

levees at all, others want a great system of levees from Cairo to New Orleans, costing at least fifty million dollars. Some want the river's bottom lowered by dredging; others aver that this plan would be fatal to navigation. Particularly on the scheme for straightening the river's course by cutting off the bends are opinions most confused and various. Men living along the river and having common interests—for example, the planter class—differ among themselves not less radically than people whose interests are partly opposed to each other, and the civil engineers are as much at loggerheads as the rest. Out of this babel of opinion, speculation, and theory, it is difficult to extract much that is substantial, or do more than state the difficulties which cross the plans for improving the greatest natural highway of our country's water trade.

Let us begin with the alphabet of the problem. If the reader were to land at almost any point between St. Louis and New Orleans, he would find that his foot, wherever it touched the bare earth, would sink into a peculiar viscid mud, tenacious as glue. Walking where leaves have fallen from the trees, this mud at every step would pick up a mass of vegetation, until at last his feet would appear like a pair of animated door-mats. Let him step next into a shallow puddle of water, say half an inch deep. The mud dissolves like snow, the vegetable débris drops off as if by magic, and the foot is free once more. I have often wondered at the marvellous facility with which this mud, usually so tense and, when sun-dried, hard as rock,

melts at the water's touch. This peculiar mire, so soluble in water, extends all along the lower Mississippi. Sometimes it is intermixed with a light porous sand, and now and then it changes to a hard blue clay, but both these also yield to water readily. Almost nowhere does one find banks of natural rock, and scarcely a gravel-bed can be discovered along the whole course of the stream from Memphis to the Gulf.

Now conceive the longest river in the world, with a current of four or five miles an hour, turned loose in a valley of this alluvial soil. The immediate valley is some forty miles wide and fifteen hundred miles long, with vast areas of lowland, and little or no ascent until the distant upland regions are reached. To say that such a river will be muddy is a feeble phrase to express the fact about the Mississippi. Its waters are simply saturated with soil all the year round. So thoroughly infiltrated is the stream with the clayey particles that the water can be purified only with the utmost difficulty, either by filtering or stagnation. On the river boats the dark water is drunk without hesitation, and, though revolting to the eye, there is no offence to the taste. Men who live on the river's banks say they can discover with the eye no difference from one month to another in the turbidness of the flood. The swift current turned against a bank cuts it as a knife cleaves cheese. A part of the soil thus taken up falls at once to the bottom, as soon as the current slackens. Often a slowing of half a mile an hour at a point a mile or two below

a washed bank means the forming of a great sand-shoal. These shoals will rise as if by enchantment. A steamer will ground across stream. She draws six or seven feet, yet in thirty-six hours there will be formed in the eddy below her keel a sand-bank reaching to the water's surface. If she swings unevenly on this bank, she is in constant danger of "breaking her back," as the river phrase goes. A bank formed in this manner around a steamer may sometimes keep her aground in her muddy bonds for months. The ice floating down from the Mississippi's upper waters usually sinks with its muddy accumulation before it reaches Memphis, and an old steam-boat captain relates that he has been startled at apparently striking bottom on this mud-ice where the lead showed several fathoms of water. Examples might thus be multiplied to show the enormous amount of earthy matter suspended in the Mississippi's flood, not to mention the unmeasured deposits at the great river's delta, or remoter facts which concern the geological history of the valley; and to all these must be added as obstacles to improvement the still grander and more complex phenomena attending the great periodical floods of spring-time, when the snow at the head-waters melts, and the lower stream bursts its banks.

In the light of local opinion it may be worth while to pass in rapid survey the theories of improvement that have thus far been broached. One theory suggests the quickening of the current of the river, either by straightening

its course—thus increasing the grade of fall—or by dredging its mouth and lower waters. It is argued by the advocates of this plan that the swifter current would more quickly relieve the spring overflow and would scour out a deeper and more fixed channel. The opponents deny that any straightening of the river can be permanent, owing to the immense deposits of mud at slack-current points, which, they say, will throw the current right or left against the banks, causing the "wash" which in time necessarily forms an elbow in the stream. They allege also a second obstacle—namely, that quickening the current will drain the river off too rapidly to allow it to hold a navigable depth at the low-water period. A third obstacle to this scheme, as well as to the whole system of levees, was suggested a few days ago by a river planter who has suffered greatly by the overflows and who seemed sceptical as to any plan at all. "The people who favor these schemes," he said, "forget the great deposits which the river leaves at the spring flood in the bayous and on the lowlands. Restrain the overflow in any way, and what follows? Simply that the river must take away all this surplus mud. I don't believe the Mississippi can do it. That mud would be left to form big banks at slack-water points; and when the river falls we shall have worse shoals than we have now; and then, when the next flood comes, the river bottom will be higher, and we shall only have to go to work and build bigger levees than before."

The scheme which, on the whole, seems to meet with

least adverse criticism is that of a system of jetties like those at the Mississippi's mouth, built by Captain Eads. Simply outlined, the expedient is that of laying down at the shallows of the river converging lines of sunken willow mattresses between which it is believed the current will scour out a sufficient channel. Even this plan is depreciated. To increase the central current within the jetties, it is declared, will lessen the current outside of them, and thus deposit two large banks, which will lift the spring floods high over the adjacent lowlands. It is furthermore averred that this jetty system would be very costly, and probably increase the necessity for levees. Indeed, throughout the whole discussion of this difficult question of Mississippi improvements it is curious to find how the twin problems of restraining the spring floods and by the same plan securing navigable low-water in the autumn constantly run counter to each other. I once knew the case of a man who met with a bad flesh-wound under the knee. If the surgeons let the wound heal, the cicatrix contracted the leg; if they straightened the limb, the wound was drawn open and healing was delayed. The Mississippi River theorists seem to flounder in much the same dilemma. At other points also there are some strange paradoxes. Let me cite a single case: Back of the river front at Sunnyside, Arkansas, some four miles from the stream, lives a well-to-do planter whose cotton farm faces a bayou and a long lake. During the floods of the spring of 1882, the waters of the lake rose and

threatened a ruinous overflow of his plantation and dwelling. With a large force of negroes, wading often waist-deep in the water, he night and day fought the rising flood by strengthening his levee along the lake front. At last came a high wind, dashing the destructive waters against the levee; and utterly discouraged he removed his family, stopped work, and waited next day for the news that his farm was under water. But instead came the cheering report that the waters had suddenly fallen six inches, and that his property was safe. The truth was that the levee of Bolivar County, Mississippi, on the opposite side of the river, and some twenty miles up-stream, had broken during the night, relieving the Arkansas shore, but carrying wholesale wreck and ruin among the Mississippi plantations. The familiar proverb of the ill wind that blows somebody good was literally realized, and the levees that, so long as they protected the Bolivar planters, threatened woe to the planters of Arkansas, by their own wreck saved the Arkansas cotton farms. And this case suggests a by no means uncommon anomaly along the Mississippi.

After sifting the opinions of pilots, captains, planters, and engineers, up and down the river, the conclusion reached is that a vast deal of the present work on the Mississippi is, and must necessarily be, experimental. The Federal Government will have apparently to lay out a great sum in the initial tests that are to lead up to a more costly and comprehensive plan. It seems pretty evident, too, that if that plan is to be undertaken at all, the Fed-

eral Government must stand behind it. Poor States like Mississippi, Arkansas, and Louisiana have seemingly neither the means nor the concert needed to assume the undertaking, though they may be able materially to assist it. This, at least, is the burden of the opinion one hears along the river, and Mississippians particularly broach the subject with bitter earnestness, declaring their willingness to sink politics and every thing else to gain the desired end. Even the men who find fault with every improvement scheme yet proposed are as vociferous as the rest for *some* plan of Federal expenditure. Their reasoning, however, is clear enough. The Government works on the banks have distributed much money along the river, and in an autumn like this of 1882, when the lowland cotton crop is all but a failure, have filled an aching void of empty pockets. It is, after all, no new illustration of human nature that men sceptical about the curbing of the Mississippi's waters should be fixed believers in the local benefits of abundant and well-paid labor. In justice, however, it must be said that these absolute sceptics are few in number, and that most people along the river are confident that the permanent improvement of their great water-way is only a question of dollars and days—albeit a good many of both.

THE SHOESTRING DISTRICT; A POLITICAL RETROSPECT.

TRENDING for several hundred miles along the western edge of the State of Mississippi, and bordering the river of the same name, is a line of lowland counties, famous for the production of cotton and filled with an immense negro population. Several causes tend to keep the white population of these river counties sparse. The region is peculiarly unhealthy for whites, for swampy lowlands, the river deposits, and the intense heats of summer beating down on decaying vegetation, all make the district miasmatic and breed the germs of the terrible swamp fever, more deadly and more feared than even Yellow Jack himself. Then, again, the plantation system remains, as regards the preponderance of negro labor, much as it was before the war, one planter employing perhaps two or three hundred negro hands. This long string of counties was thrown into one Congressional district when in 1876 the Democrats overthrew the Ames government of Mississippi, gained control of the executive and legislative branches, and gerrymandered the State; and from its sinuous length and narrowness, it took the appropriate name of the "Shoestring" District. The actual voting strength of the district on a full and

fair ballot never yet has been tested. But probably its voting population numbers about thirty thousand, of whom twenty-four thousand are negroes, giving that race a clear majority of eighteen thousand. The Shoestring District has now passed into history with the redistricting of the State in the winter of 1881–2, when the line of river counties was cut into two parts. But the name still survives, and is a fitting title under which to describe the carpet-bag era in Mississippi and the political sequels of it which one finds in the State to-day.

Before entering upon the story of political convulsion in Mississippi, let me venture to say that the writer of this letter is a resident of the North, a New Englander, and an independent in politics, who has usually acted with the Republican party. His aim is to extenuate neither the subversion by the whites of a free ballot, nor the evils of misrule by the blacks; but simply to give an unvarnished narrative of the facts.

When the State of Mississippi was reorganized after the war, it offered a most promising field for the political adventurer. The State, in spite of some devastation by the conflicting armies in the northern and river counties, remained rich in productive corn and cotton lands. Its debt was and still is insignificant for a State of its size, and the great negro majority of not less than thirty thousand votes made the white property-holding class, already stunned by the war and the loss of their slaves, still more lethargic as to their political rights.

When they reflect soberly on that early period of civic reconstruction which followed the hybrid and chaotic Administration of Andrew Johnson and began with that of Grant, Mississippians are disposed now to charge themselves with too much supineness and apathy. They concede that materially it would have been far better had they entered actively the political field. Some of them even go so far as to wish they had then joined the Republicans and trusted the Grant Administration for those favors which it afterward threw so recklessly and hurtfully to the men of the Casey, Packard, Spencer, and Elliot stripe. Whatever might have been, the fact remains that the white property-holders and men of influence in Mississippi stood aloof, tilling their cotton-fields in a petty and half-hearted way, and that a horde of political adventurers rushed into public office.

That many of these political pirates came from the North cannot be questioned; and the chief leaders of what came to be known as the "carpet-bag" party were undoubtedly of that class. But far outnumbering them numerically were their indigenous henchmen, low whites, "yellows," and negro politicians of Mississippi, as shrewd as they were selfish, who, living in immediate contact with their race, did far more than the carpet-baggers proper in keeping up its political organization. Of the new-comers from the North some few came in the spirit of Servosse, as depicted in the "Fool's Errand." They entered the State bearing capital, ready to take up at the then low prices the smaller

cotton farms, treat the negro fairly or even philanthropically, and grow up with the new life of the Southern country. But this class quickly divided into two extremes. A part were seduced into politics, and became the worst of carpet-bag leaders; the others joined the Democrats and became the foremost of "bull-dozers"; while the large majority of the new-comers were low politicians of just about the class to be found among the ward politicians of the New York Custom-house during Grant's Administration. Then the tide of misrule quickly ran to its height. The power of the President shielded it, and it was abetted by that system of bad Federal appointments which made Grant's Southern policy scarcely less disreputable at the North than it was in Mississippi. A French resident of the State, a Union man during the war, and a most dispassionate and intelligent talker on the whole subject of reconstruction, has given me some vivid and revolting descriptions of the few years of carpet-bag government that followed. The colored vote was skilfully organized under the white captains of fifties and the colored captains of tens. Every negro church became a focal point of political activity. Democratic negroes, what few there were, were ostracized mercilessly by their fellows, and the term "white man's nigger" became an epithet that they were taught to dread. The scenes in the negro Legislature at the State Capitol in Jackson during those days, as described to me, rivalled the worst spectacles of the Moses Legislature during the darkest hours of carpet-bag sway

in South Carolina. Fortunately, perhaps, for Mississippi, her financial reputation had been so blasted by the repudiation of the notes of her State bank thirty or forty years ago that no great State debt could be negotiated. But the power of county and municipal taxation was a large one, and was abused excessively. In some counties during this period of predatory legislation the taxes went up to five per centum on a full valuation; and in Vicksburg, for example, the debt reached one third of the taxable value of all the property in the city.

Lest this portrayal of the evils of the time may seem overdrawn or distempered by Southern fancy, let me draw on testimony which, on its own merits, must be conclusive. In the southeast corner of Arkansas, on the Mississippi River, is the county of Chicot. The negro vote of the county outnumbers the white vote some ten to one, and the political condition of affairs has been almost the exact counterpart of that in the Shoestring District of Mississippi, on the opposite shore. To this county of Chicot there went some fourteen years ago two Kentuckians, father and son, to take charge of a large plantation near the river bank. The son had been graduated with high honors at the University of New York; the father had been a citizen of prominence in his native State; and both had served with distinction through the Civil War as officers in the Union Army. A few years later they were joined by two other sons who had just been graduated at Yale. All the family had been staunch Republicans, and

the three brothers who have survived their father are still so on all national questions. The testimony of men of this cultivated and intelligent stamp, after many years on a Southern plantation, is too valuable to be omitted. Here it is as I heard it from their own lips:

"We came to the plantation, not merely with the hope "of making money, but of uplifting the negroes. We "hoped that, as Republicans, we might exercise influence "over them. We found that hope delusive. We tried to "persuade our own hands to put up good men for office, "or at least vote for good men when nominated. It was "like talking to stones. The very negroes who trusted us "implicitly in money matters, would listen in dogged si-"lence, then go off and vote heedless of our advice. They "were then under the influence of carpet-baggers and "Southern whites who drank with them, lived in their "company, and were on an even grade of social equality; "and we found that unless we lowered our conduct to "the same level, the hope of obtaining influence with "the race was an empty one. Meanwhile our county "and other local taxes ran up to the verge of confisca-"tion. In 1872 we valued our plantation at $70,000; "that year our local taxes were $6,900, or almost ten "per centum. Under these circumstances there was "only one thing to do in local and State politics—act with "the Democrats; and subsequently, by appeals to the "Democratic Legislature and to the courts, we got some "relief. But negro politics in this county, which is still

"controlled by the colored men, are intolerably bad in "spite of our utmost efforts to correct them. The negro "schools particularly, for which we are heavily taxed, "are a mere farce. For one school in this school-district "a few of us pay a tax of about $1,200 yearly. The "school-house is open only two months in a year, and the "funds are systematically squandered."

This school-house, by the way, the writer himself examined—a miserable, battered one-story affair, scarcely fit for a bonfire. An inquiry as to the number of colored voters in Chicot County who could read and write brought out an estimate of one in twenty. This proportion would, no doubt, be increased if we were to count the negroes who can spell out a few words or do a trifling sum in settling their cotton-accounts with the planters; but the estimate is probably a fair one for the colored voters who can actually read a newspaper or book. The figures given for negro illiteracy in Chicot County represent a fair estimate also for the Shoestring counties of Mississippi; but it is only fair to say that the negroes of the river districts, recruited constantly from the miserable roustabouts of the steam-boats, are probably the most unlettered of their race in the whole South.

The result of the abuses described was that "shotgun" policy which, at the time it was adopted in Mississippi and in South Carolina, created so great a stir throughout the Northern States. On careful inquiry I am convinced that the horrors of that expedient by which the Ames

government was crushed through the suppression of the negro vote have been not a whit exaggerated. The stories of the picketing of the roads by armed whites, the shotgun watch of the ballot-boxes, the fraud, the intimidation, and bloodshed are substantially true. "Bulldozing," in fact, had many more effective refinements than the shotgun. Negroes were paid double wages to stay at home on election-day, merchants who supplied them threatened to stop their cotton-credits, and every device, including actual purchase, was used to supplement violence. It seems strange, in a civilized country and in one of the States of our Union, to hear Mississippians boast of their part in a policy which has nullified a free ballot and absolutely subverted constitutional law. Why the negroes, with as ample a supply of shotguns in their homes as the whites, did not resist may mystify Northerners. The reason of this was that the leaders had been "fixed," as the Southern expression is, long before election-day. As a rule, they had been driven away or so thoroughly intimidated that they made no attempt to organize; and without organization by some superior mind the Southern negro is helpless as a baby. The negroes, moreover, of the rank and file were disgusted with those long-unfulfilled promises of their leaders, of which one, the famous "forty acres and a mule," had a national celebrity. Many of them saw with complacency the defeat of men who had given them nothing but broken pledges. As to the broader moral aspects of a

revolution which met wrong with wrong, Mississippians say: "We merely protected our property and our homes. You Northern men, in like conditions, would have done the same." As to this reasoning, each man must, of course, form his individual opinion.

With the transfer of power to the Democrats by that shotgun revolution, the Republican party, as such, ended its existence in Mississippi. The negroes, as a rule, with their leaders expelled or subjugated, have been utterly incapable of organization. They rarely talk politics, take little interest in elections, and when they do vote, at least a third of them cast Democratic ballots as a favor to their white employers. Sometimes they come out in petty local contests; but, generally speaking, even in strong negro counties, they are lethargic. The whites usually allow them to vote; but Mississippians have confessed to me that the whites, when the result is worth it, are pretty apt to "doctor" the returns; a thing very practicable so long as Democrats are in control of the ballot-boxes and tally-sheets. Curiously enough, too, now that carpet-baggism is disestablished, the whites themselves appear very indifferent to politics, State or national. They profess, I think sincerely, to subordinate every thing to the development of the material resources of the State. I find, for example, all along the river that Democrats say they would vote for a Republican for President rather than imperil the improvement of the stream by Federal money. As to the ostracism socially of Northern settlers,

it is and has been greatly exaggerated. The three brothers to whom I have referred, for instance, have always been on most intimate terms with the white Democrats of Chicot County. But this would scarcely be possible for any Northern settler who entered into close political relations with the blacks. He would be allowed to vote, and his vote would probably be counted; but social recognition, so long as he made personal fellowship with the negro, would probably be refused him. Practically, a phrase or two like the "Yankee ticket"—*i. e.*, Republican ticket—have been all the evidences of the old sectional antagonism that appear above the surface. Underneath, however, there smoulders not so much hatred of the North as fears of the recurrence of carpet-bag rule. This cropped out once in the talk of a prominent citizen of Vicksburg who, referring to the effort of the notorious Chalmers to "Mahoneize" Mississippi and array race against race anew, said to me: "In that case, all we have to do is to organize our (shotgun) party, as we did seven years ago."

Such is the sad and sombre picture which any fair-minded man who has been on the spot must draw of the political revolution in the Shoestring district and the State of Mississippi—a revolution which, by methods more or less tragic, has subverted the brief carpet-bag dynasties in other Southern States. Looking back now on that strange and anomalous series of political events, it is, perhaps, hard to draw rigidly the line of right and wrong

between the races. But, as a personal opinion, I must assert that even in a New England State the same sort of convulsion would soon or late have resisted the same legislative assault upon the rights of property. The revolution in Mississippi was indeed only the logical outcome of the misguided partisan policy which, after the Civil War, enfranchised at the South predominant ignorance.

THE SOUTHERN PLANTER.

ANY Northern man who, in these days, makes a prolonged trip through the South must, of course, be ready to make allowances for the material flaws which he sees. The havoc of war, the loss of slave-property, the transition to a system of free labor, the carpet-bag era, must continually be kept in sight as obstacles in the work of upbuilding the South. But making all due concession to these obstructive influences, there will remain a surplus of disappointment. I am not speaking now of what quoted figures of the census may seem to reveal, or of the absolute progress of many Southern communities—Northern Georgia, Texas, and part of Florida, for example, leave nothing to be desired in the rate of their recent material growth. I refer rather to general signs, which express themselves directly to the sight, leaving painful impressions of Southern backwardness, and all the more disquieting because they imply inherited faults of Southern character.

Let us draw a rough picture of the ordinary Southern plantation home as one finds it to-day, eighteen years since the close of the war. It is usually a stately two-story structure, pillared in front, rarely ornate as to architecture, and with rather an impressive air of aristo-

cratic comfort. But examine it closer, with more attention to detail! The paint is worn off, and long weather-marks cross its front. The cornices and mouldings are fast rotting to decay. Here and there in the upper story is a broken window. The shingles are moss-grown, and the chimney is rough-edged from disintegration of mortar and brick. The great front yard of several acres, which used to reach out far before this antique dwelling to the street or roadway, has been cut in twain by a cross fence, reducing it to half its old surface. The rows of trees are rough and untrimmed. Ducks, geese, pigs, and a gaunt horse wander through the door-yard, making its slope as rugged as a pasture. A scattered pile of wood within a circumference of chips is a side-scar on the scene. Battered fences, a musty-looking clump of out-houses, a barn-yard where one or two dismal mules are meditating, fill out the picture of shabby grandeur.

The owner of this typical mansion is usually a gentleman—and a real one—whose outward aspect is not much different from that of a well-to-do Yankee or New Yorker who has been born and bred in the country. But he is far more courteous and polite, not merely as an art, but as a genuine element of his character. His kindness to a guest is not a formality but a hearty, voluntary impulse—even when carried to a point which we at the North would regard as absurdly sacrificial. No inconvenience is too burdensome, no hospitality too unstinted to be refused a guest. The planter's own time,

his family plans, his horses, his guns, his fishing-rods, must all be at the visitor's full disposal. Let me be absolutely just to Southern character, and say that the same courtesy extends to the stranger met on the road or railway train, and that in less degree the same innate politeness is shown even by the poor Southern whites. I have often been amazed at the natural courtesy both of speech and manner of some unkempt native of the South whom, at the North, we would set down as a common tramp. Southern chivalry has its deep-rooted and detestable faults, some of which will be touched upon before this chapter closes; but among its best qualities must be cited graces of common social intercourse, extending down through all classes, which the Northerner rarely finds matched in his own communities.

Personally speaking, this quality is most attractive. But economically the kindly social habits generated during the slave times, inherited from fathers and still perpetuated, are a fearful bar to material progress. Well enough they were, perhaps, when the planter had large surplus wealth in human stock, and when the sale of one or two negroes might fill the gap in the annual interest on a mortgage. But the system is fatal now, when industry, watchfulness, and household economy are the only conditions on which the plantation can be saved from the creditor. If, after seeing lately many plantations in the Mississippi Valley, I were to be asked what is the chief obstacle to Southern progress, the answer would be the wasteful ex-

travagance caused by too much sociability—an extravagance penetrating the whole of the planter's life. The methodical Yankee, accustomed to close and systematic management, would be profoundly amazed at the way the ordinary planter "runs" a plantation of, say, a thousand acres, with a hundred negro hands. It is a vast and ramified interest, as intricate as a big New England factory. Yet the planter scarcely ever keeps a set of plantation books. His costly implements of cotton culture—ploughs, harrows, and cultivators—are constantly seen rusting in the fields, just where the negro hands have left them months before. He may be staggering under an annual interest charge, yet he must have his horses for pleasure, his costly guns, and expensive double wagons, to be worn out quickly on rough rutted roads, upon which a Yankee millionaire would scarcely use a buckboard. The younger planters, too, seem to think it essential to human existence that they should "treat" frequently, gamble a little, and buy a few lottery tickets each year (I may add parenthetically just here that the Louisiana State Lottery is one of the economic banes of the whole Mississippi Valley merely from its effects on character). To sum up the whole matter in a sentence, this ancestral and misguided sociability of the planter, to which we give the hackneyed name of "Southern hospitality," is too often more like the last splendid banquet of a bankrupt on the verge of ruin than rational liberality. A very ordinary New Englander would make a good living out of what the planter habitually wastes.

Political economy grinds in the end as surely as the gods. The inevitable result of this prodigality and loose management is debt, bad credit, and enormous rates of interest. Under ordinary conditions, the rate of interest would be high in the South, where the negro is improvident, cotton crops and prices very uncertain quantities from year to year, and loanable capital scarce. For example, in the whole city of New Orleans there is said to be only some $10,000,000 of capital to be lent planters who produce an annual crop of cotton alone worth $60,000,000. But, add systematic laxity in working plantations to the foregoing natural elements of high interest, and the rates which the planter has to pay the factor for necessary loans become terrible. Counting commissions of all kinds, it often amounts to twenty-five per centum a year on the loan, while banks in towns on the lower Mississippi find no difficulty in getting two and one half per centum a month for short advances in cash; and all loans, short or long, it must be remembered, are secured by mortgage on plantation properties, with large nominal margins. Other causes which are obstructing the planter's progress are the cotton-worm and the great cotton product of Texas, a State which has become a sort of marplot among other cotton commonwealths, keeping down the price even in a year when the crop is a bad one throughout the Mississippi Valley. What wonder, under all these circumstances, that the debt-owing planter longs for cheap Northern capital to come down and "develop" the country!

That this Northern capital will go down ultimately, when so high rates of interest and also good returns on landed investments can be secured, is certain. But it will go down far quicker if the South will first take a warning or two from Northern civilization. One lesson the South has yet to learn is the prompt enforcement of law against crimes of violence; for it is the bald truth that murder and lesser crimes go unpunished so often that sometimes it seems as if law were exceptional and crime the natural order. About one year ago I was on a Mississippi boat ascending the river. Out of the thirty passengers on board three were murderers. One of these, whose wife had been grossly insulted, had followed the offender for several hundred miles to Greenville, Miss., deliberately emptied two gun-barrels loaded with buckshot into his victim, and then gone up to the quivering body and shot off every barrel of two revolvers into it—"made a lead mine of him," as the act was picturesquely described. The slayer was brought before the Mayor of Greenville and discharged. To speak frankly, so terrible had been the provocation that it may be doubted whether a Northern jury would have convicted him; but would he not at least have been tried by a jury? On the same boat were a hoary gambler who a little while before had shot a rival player over a card-table, and an insignificant, shock-headed young fellow who, when dunned by a creditor, had settled the debt conclusively by shooting the man as he sat inoffensively on a cotton bale. An Arkansas jury

had acquitted the debtor, and as for the gambler, he had never been tried. So, also, awhile ago I was in the near neighborhood of another tragedy. A plantation manager had been threatened by a negro. The white man took a gun and shot the negro, who was running away, inflicting a wound which, at my last reports, was expected to be fatal. I heard at least a dozen white people, at one time and another, discussing this crime, and the universal sentiment was one of sympathy for the criminal. The worst of this thing is, however, that Southern feeling in favor of making crime odious does not seem to perceptibly increase; and Southerners need as yet to be duly impressed with Northern sentiment on these matters of free murder, carrying concealed arms, and general lawlessness.

One of the most curious of the anomalies of Southern society is the strong religious spirit often prevalent in communities where these crimes of violence, repudiation of debts, and other misdeeds are rampant. The very set of people who are persistent church-goers, and recognize no epithet so vile as "atheist," have few compunctions as to shooting, fewer still as to casting the ballot which goes to cheat a Northern creditor out of his State bond. It reminds one of the phrase attributed to the Texan: "Wife, give me my pistol; I 'm going to prayer-meeting to-night."

A striking yet logical sequel of the high rates for money —as well as commodities—at the South has been the in-

flux of Jewish traders into all grades of traffic from itinerant peddling up to the large store for plantation supplies. In the towns and small cities of the lower Mississippi valley the posterity of Abraham have well-nigh monopolized smaller trades, and at Vicksburg it seems as though every business thoroughfare were an offshoot of Chatham Street. In the straits of the cotton farmer and the thriftless ignorance of the negro these "cent. per cent." Israelites find a field of traffic as profitable to themselves as it is ruinous to their customers.

Nevertheless, when all that is negative has been said, there remain many wholesome and encouraging signs. One is the really rapid decline of sectional animosity, now that the predatory carpet-bagger has been driven out. Politics are everywhere in a decline, and the South, so far as feeling goes, is ardently seeking material growth. Scarcely anywhere to-day would a Northern Republican be ostracized, provided he goes about his business, behaves himself, and does nothing worse politically than vote the Republican ticket. As for slavery, the feeling is also very rational. Naturally there is regret for loss, and wistful glances back to the days of comparative opulence; but rarely does one find a Southerner who will assert that he wants the slave system, with its immoralities, back. The "institution," which used to seem to him Scripture-founded, is remembered now with only a poetic regret, often expressed in verse, story, or song, whose burden is the good old times.

To say nothing of up-growth of cotton factories and other industries the planter has received a big "lift" from the cotton-seed industry. Before the war practically all cotton seed went to waste, except a small fraction used as manure and what was reserved for planting. Every bale of cotton represents about a thousand pounds of seed, worth at the gin, say, six dollars. Assuming that each acre grows half a bale of cotton—a low estimate—and that half the seed product is reserved for planting, there will be a net product for each acre of a dollar and a half, which was substantially lost in the old times. Within a few years the industry of making cotton-seed oil has increased immensely, until the manufactured product in oil and oil-cake is estimated as worth ten million dollars. As is well known, the oil is often substituted for olive oil in table use, while the cake is exported in large quantities to be used for cattle feed. The industry is a peculiarly ingenious one. First, the seed is taken into a fine-combed gin and the short cotton left by the plantation gins pulled away. This produces about thirty pounds of short staple cotton to each ton of seed, worth six cents a pound. The seeds are then hulled by machinery, the kernels ground into meal, which is heated to a certain point, then placed in tough sacks and run into an hydraulic press, which extracts the oil, leaving the yellow meal in hard cakes. The meal is not unpleasant to the taste, much resembling buckwheat flour, and I have heard of its use for human food. Each ton of seed ultimately produces about thirty gallons of

oil, worth at this time forty-five cents a gallon; eight hundred pounds of cake, worth twenty-two dollars a ton; lint cotton, worth a dollar and eighty cents; besides soap material derived from the refining, and the hulls, which may be used both for fuel in the factory and as compost. Both the home and foreign demand for oil-seed products is increasing rapidly, and the factories are said to pay large dividends. But like cotton itself, cotton seed is a crop much wasted and abused. Every sack of seed seems to have a leaking hole in it, and at Memphis, all along the sloping river bank, the voyager has to fairly wade through several inches of putrid decaying seed ere he reaches the wharf boats. As to cotton, a single glance at the tattered, half-covered bales, soiled with mud or soaked with rain, is enough to prove how shiftlessly the crop is treated.

Finally, as to wholesome signs at the South, the annexed figures are suggestive, as showing the break up of the big farms and partial disestablishment of the plantation system:

	Average Size of Farms. (Acres.)		No. of Farms.	
	1870.	1880.	1870.	1880.
Alabama . . .	222	139	67,382	135,864
Arkansas . . .	154	128	49,424	94,433
Florida . . .	232	141	10,241	23,438
Georgia . . .	338	188	69,956	138,626
South Carolina . .	233	143	51,889	93,864
Louisiana . . .	247	171	28,481	48,292
Mississippi . . .	193	156	68,023	101,772

	Average Size of Farms. (Acres.)		No. of Farms.	
	1870.	1880.	1870.	1880.
North Carolina . .	212	142	93,565	157,609
Tennessee . . .	166	125	118,241	165,650
Texas	301	208	61,125	174,194
Virginia . . .	246	167	73,849	118,517
	231.3	155.3	692,176	1,252,259

How far this subdivision has been accompanied by more improved and precise methods of agriculture is hard to affirm. Certainly the system is bad enough now, and if there has been much progress, the original system must have been absurdly wasteful.

To sum up the situation, the Southern planter as well as Southern communities in general have a great deal yet to learn as well as unlearn. The planter must unlearn his prodigal habits, must curb his convivial nature, practise the plantation economies, and set bounds on his misguided hospitality; and communities appealing for our dollars must remember that Northern capital has still a chronic prejudice in favor of regions where "dying in the boots" is not so popular as passing away respectably in bed with the boots off.

THE NEGRO OF THE MISSISSIPPI BENDS.

THE two strips of land running from Helena, Arkansas, to Vicksburg, Mississippi, for several hundred miles down the Mississippi River, are known locally as "the Bends." More precisely speaking, the term belongs not only to the country included within the elbows of the great stream, but also to the lowland region reaching ten or twelve miles back from the banks. For the most part the Bends are a region of desolation made up of swamps, expanses of semi-tropical brushwood, bayous, and the system of horseshoe lakes, some of them twenty miles long, formed in old beds of the river. But intermingled with these forbidding features of the country are many rich and extensive cotton plantations peopled thickly with negroes. These negroes of the Bends are probably the purest types of their race to be found this side of Africa. The civilization of the whites, whom they largely outnumber, and with whom they never associate, has scarcely touched them; indeed, at only two points on the river, for a distance of three hundred miles, have they a chance to see a railroad or telegraph. Huddled together on their plantation settlements, rarely leaving home, and working out for themselves the simple problems of their lowly lot, they form a class whose life and habits reveal the lower

phases of negro character most faithfully, most amusingly, and, in certain aspects, most sadly.

While the plantation negro of the Bends in many traits and tastes is like the other freedmen of the South, in one point, indifference to dress, he diverges. The females apparently love finery, and dress their children often with some slight effort toward neatness; but the adult male is, generally speaking, contemptuous of raiment. A coat is a coat for him so long as it will hold together in a chain of rags, and a hat is a hat whether it is a smashed stove-pipe or a ribbonless, tattered, faded pot-lid of a tile. The feeling of the plantation hand seems even to go farther than that, and to resolve itself into a positive affection for rags and patches. He seems a kind of apostle of tatters, whose chief aim in life is to discover how many variegated patches his pantaloons can take on without complete loss of identity, or how many rags can be produced to the square foot of integument. Something, of course, must be allowed for his rough work in the cotton-fields, and something more for the simple demands of fashion in the warm clime and lax civilization where he dwells. But outside of and above all that, he seems to cultivate a real æsthetic delight in his looped and windowed raggedness. His hat is always shapeless, saw-edged, and ventilated by many casual outlets, through which the dark wool protrudes; his coat, if he has one, is either many sizes too large or a size too small, with immense baggy pockets; his pantaloons, if not ragged, are covered with patches

representing every tint of the rainbow, and so many in number that the original garment serves only as a spectral framework on which the later accretions are hung; and his boots, a size too large and of colossal proportions, have as many twists and angles as a big knot of wood, which, indeed, they much resemble. Mount this strange mortal, with his gleaming teeth and grotesque profile, on a gaunt, uncombed mule, and the combination of man and beast is simply indescribable. It makes one imagine some fanciful plantation Don Quixote, a knight-errant of the rag-bag. Talk of burlesquing on the minstrel stage the garb of one of these plantation negroes! The simplest reality in the Bend region burlesques burlesque and eclipses the completest triumph of minstrel make-up.

Speaking of the mule, by the way, suggests that brute's unique place in the life of the plantation, The animal on the cotton farms of the Bends is what an illiterate Yankee dame used to call a "bond of separation" between man and man. Half the bitter quarrels and jealousies between the negro race spring from some transaction about a mule. The white planter usually owns the animals, and supplies them to the colored laborer for the season. By a pleasant fiction the colored man is supposed to take good care of the mule, and after using it in tilling his plot of land, is allowed to ride it as though it were his own during his trips about the country. This long possession of the mule breeds in the negro a morbid sense of ownership. Even the white owner sometimes finds it hard to assert his title,

and to another negro the holder will rarely yield the animal up even by the master's order. The owner must get the animal himself, and himself make the transfer, unless he would offer a deadly insult to the holder. Either his uncertain tenure or some more recondite reason makes the negro's mind peculiarly sensitive on this subject of the mule; and many are the asperities among the black race of which this useful and not always inoffensive animal is the spring.

One of these common "trubbles about de mool" came under my eye some time ago, and the story of it will serve to show another trait of negro character in the Bends. At Lakeport Landing, as well as at most of the small stopping-places on the Mississippi River, is a well-stocked store, which is a trading and supply station for the plantations near by. These stores in the evening, particularly as Christmas draws near, are centres where the plantation hands gather, and where one may study negro life in some of its oddest states. Entering the store on a recent afternoon, I found a mule trouble in full blast. The victim was an herculean negro with a brutish face, employed by Mr. Ford, a neighboring land-owner, who, after sending a negro for the animal, had, as usual in such cases, been forced to go and get it himself. The aggrieved holder had gone to the store, braced himself with a glass or two of cheap whiskey, then opened his harangue to a knot of dusky auditors. A fragment of his discourse may be appended as a fair specimen of the

ferocious but utterly harmless talk in which the negroes of the region love to indulge:

"Now, you niggahs heah, just listen to me. Dere ain't one of yer gwine to get dat mool. I 'se been heah six months on Mister Ford's place, and just 'cause I 'se a new niggah don't yer think to disexpose [impose on] me. De man dat comes to my house for dat mool 's gwine to hab de life let out of him, shuah. I 'se got a big shooter to hom', and a razor beside. Just, now, don't yer forget hit, I lub dat mool, and I 'se gwine to keep him, shuah. My name 's Pete Smith. I was raised in Adams County, 'Hio. Went to school dere seven year, and dere wa'n't no man dere for a hundred square mile could 'cite Shakspere as I could. Just you remember *dat*, and don't one ob yer come for dat mool; for if yers does y 'ill be on de road to de grabeyard, shuah."

All this time, it must be remembered, the mule had already been taken away, and had actually been transferred to a second negro, as the orator well knew; so that Mr. Pete Smith's murderous warnings were all contingent on an impossible event. This ludicrous aspect of his harangue, as well as his desire to impress his hearers with his liberal education and his familiarity with Shakspere, as qualifications for murder, both show that consuming love of sensation and brag which, while common to the colored race, prevails to an incredible degree among the negroes of the Bends. Only give a colored man some real or fancied wrong, with one auditor to talk to, and his

bombast is limitless; while two of them in a dispute, though they always seem on the point of cutting each other's throats, almost never reach even a blow. They taunt, threaten, insult each other, slaughter metaphor and polysyllables mercilessly, and there the thing ends. At the store heretofore mentioned, some two nights before Christmas eve I saw at least forty negroes, men and women, most of them stimulated by whiskey, brawling, yelling, threatening, and, seemingly, for two hours, ready to fight. But not a blow was struck, business went on as usual, the few whites took no notice of the racket, and every thing went off peaceably in a crowd which, had it been Irish or American, would certainly have seen bloodshed. A funny illustration of this same negro trait is related by a local planter, who once found two of his negroes quarrelling, with a shut door between them. They "dared" each other out and in for half an hour with blood-curdling threats and profanity. Suddenly a child opened the door—which had not been locked at all—leaving the foes face to face. They glared for a moment, then, realizing that a crisis had come, each slunk away. Even the women constantly rule their young children with threats of the "I-'ll-cut-your-heart-out,-honey" order. To hear these negroes talk a stranger would imagine them the most gory-minded race on earth; while the fact is, though most of the males carry pistols, violence is vastly more uncommon than among people of the same degree anywhere at the North. Volubility is their safety-valve.

So, too, as part of his desire to appear a bigger man than he really is, the negro of the Bends hates to confess ignorance of any thing. You ask information of him on some simple point, and, if ignorant, his usual reply, in a low, apologetic tone, is, "Don't know, sah." Then instantly (in a louder tone), "Did know once, but just now I disremember." One reply I have had given to a question of the kind was: "Don't know, sah; but think I 'd know if somebody was to tell me." Though the negroes love to be thought lettered, and, to impress their fellows, will con for hours a book in which they scarcely know a syllable, they, as a rule, are grossly illiterate. Probably not one in twenty has any practical knowledge of reading or writing. Many of them get in arithmetic no further than the simple record—as a memorandum—of a number which they usually put down exactly as spoken; thus, 200502 for two hundred and fifty-two. In consequence, some of their petty cotton accounts look as big as a national-debt statement.

The curse of the plantation negro is his improvidence; or, to speak more strictly, it is the curse of the credit system of which he is a part. The store-keeper, the planter, and the negro all have to run in the Bends on long credits contingent on the cotton crop. In the case of the negro, this is a double evil for him, because the credit system not only means excessive charges for his supplies, but quick exhaustion of them, as he imagines that "credit" signifies something indefinite, vague, and

large, which will sanction extravagance. As a rule, working his wife and a child or two in the cotton-picking season, he can earn not more than two hundred and fifty or three hundred dollars a year; and while his actual wants are few, his desires are boundless. Beginning his working year with a credit at the store of, say, a hundred dollars, he exhausts this, and perhaps a further credit, in a thousand improvident ways. He makes reckless domestic purchases, drinks whiskey, while costly trash like sardines, canned oysters, raisins, and candy are crammed without limit down his craving maw. I have heard of a negro who, during one visit of an hour or two at the store, ate truck of this sort amounting to twelve dollars and a half, charged against his credit. In consequence of all this the negro's account soon ends, and the close of the season finds him in debt; then the planter and store-keeper have to carry him through the winter on short supplies, and almost on a pauper basis. He revels for five months in the year, and he and his family starve the other seven. Even when industrious and saving, he finds it hard to do any thing with his money. Of land titles he is suspicious, and therefore he rarely becomes a land-owner; there are no savings-banks for him within four hundred miles, and if there were, the fate of the ill-starred Freedmen's Bank, which every southern negro seems to have heard of, would probably deter him from deposits; of railroad or even government bonds he is as ignorant

as a Feejee. So he usually ends either by burying his money in the ground or trying with it to lease or work a larger plot of cotton, an enterprise in which, owing to his defective organizing faculty, he commonly fails. If the idea of the accumulation of money by interest in some safe investment like a government bond could once be grafted on the negro's mind, the benign results for the freedmen would be inestimable. But how to inculcate that idea on his defective intelligence is a problem that still awaits solution.

Even the improvidence of the negro, like other plantation faults, has now and then its amusing side. A few years ago there visited the Bends an unprecedented cold snap, the snow falling to the depth of a foot and a half. The negroes are peculiarly susceptible to cold, but never keep a large stock of fuel, although the woods are close at their doors. The snow caught them with low wood-piles, which were quickly exhausted, and they had no sleds to drag more fuel with. Consequently, as a planter friend relates, nearly all the negro families of the region had to go to bed for two whole days to keep warm. Now and then a member of a bedded family would make a dash for a moment to seize something to eat, and then retire quickly to cover to make his meal.

But the qualities of the Bend negro are by no means all negative. He is docile in his relations with the whites, rarely ill-tempered, and never nurses malice. The planters always adjust the most bitter quarrels between two of

their hands simply by delay. Both may be deadly foes on Saturday night, and on Monday have utterly forgotten the feud and its cause. No planter, when appealed to, ever interferes in a negro quarrel. He counsels delay, or makes some temporizing promise, and in a day or two the whole difficulty lapses. The plantation negro, also, is uniformly respectful and will do many small favors, expecting no reward, though, of course, he will accept it, if offered. Occasionally too he gives evidence of a humor with a decidedly original plantation smack. For instance, a planter not far from Lakeport Landing some years ago won ill-repute among his hands for deceptive figures in settling cotton accounts with them. They composed this couplet to symbolize his one-sided mathematics:

> Ought 's an ought, carry nine,
> Dat makes all de cotton mine.

A like couplet composed for a similar case runs as follows:

> Ought 's for an ought; one 's for a figure.
> One 's for de white man; ought 's for de niggah.

Few linguistic oddities are stranger than the use of some words adjectively by the Bend freedmen. They employ the expression "sure enough" much as the Yankee uses first-rate; as, for instance, a "sure-enough mool" for a good animal of that species. The word "stogie," applied at the North only to coarse shoes or boots, is a negro adjective in the Bends meaning common

or poor; while a "stogie," used as a noun, refers to a vile cigar sold for five cents.

As field-hands, though slow, the negroes are generally steady workers. As house servants they are dull and inferior, except that now and then a black woman can be taught mechanically to be a good cook. Physically the Bend negroes are often magnificent human animals—the men muscular, large-limbed, and big-chested; the women robust and straight as a dart, owing, as is alleged, to their habit of carrying burdens on the head. Almost every large plantation has upon it two or three males who can each lift a bale of cotton weighing five hundred pounds, and usually one negro who can shoulder and carry it some distance—a feat peculiarly difficult with so awkward a weight. No reference to the physique of the Bend negro would be just without a tribute to the preternatural hardness of his cranium, the proverbial gift of his race. The often-described habit of using the head as a battering-ram in warfare prevails very commonly, and one dusky fighter has the reputation of invariably conquering his antagonist if he can once clench him and hold him at "butting" distance. I once saw the mate of a river steamer, a muscular fellow, wielding a thick hickory cane, strike with all his force a negro deck-hand fairly on the skull. The blow was terrific. It cut the negro's felt hat, opened the skin until the blood flowed, and made a sound which could have been heard a quarter of a mile away. No white man could ever have received the blow and survived. But the

negro, though he staggered, gave it no attention, nor even raised his hand to his head. My planter friend tells also of an incident in his gin-house, where a negro, hurrying with a sack of cotton on his shoulder, struck a beam with his head. The blow was like the stroke of a sledge-hammer, and the whole building quivered. "That must have hurt your head, Jim," said my friend, pityingly. "No, sah," was the reply. "Did n't hurt my head a bit, but sprained my neck dreffly."

Take him all in all, the Bend negro is not a bad fellow. The effect of him, as a whole, inconsistent as the statement may souud, is not half so bad as when we analyze his traits separately. His failings, somehow, seem to offset each other, and over them all his good nature and amusing ways throw a halo of fun. Even his deeper faults, some of which have not been recited in this chapter, are those for which his degrading ignorance is chiefly responsible, while that ignorance, in turn, must be charged to the blight of slavery, in whose near shadows he is still dwelling.

NEGRO RITES AND WORSHIP.

AT no point does the Bend negro's love of ostentation reveal itself more plainly then in his rites and ceremonies. Religion, marriage, and more secular observances would be nothing comparatively to him unless attended with some form of emotional excitement; and excitement cannot be generated in his peculiar nature by any thing that is subdued and undemonstrative. Among the negroes of the Bends there are institutions called churches, there is a rite called marriage, there is a ceremony after death called a funeral. I have used in the foregoing sentence terms which have a familiar meaning when employed by the whites, but they become fantastic when one finds what they signify among the Bend negroes.

A funeral among the Bend negroes has by no means the solemn significance of mortuary observance among the whites. No doubt some genuine grief goes with it. But the prevailing feeling of the adult members of a bereaved negro family is a kind of mournful exultation, a sort of "luxury of grief," which comes from being for a few hours the central actors at a ceremony in which a whole community takes part. That community in turn attends a funeral less ostensibly from any profound sorrow for the dead than to minister to its morbid passion for

display, and to indulge the emotions which song, preaching, and shouts always arouse in the colored race. The corpse, as decently laid out as the narrow means of the family will permit, is placed in its rough coffin, which is lifted into a wagon drawn by two mules. It is the traditional and always exacted privilege of the nearest of kin to sit on the coffin as it goes to the grave. Over the wagon, and often in the procession, are borne small flags of diverse colors, each with its meaning. A black flag indicates the bad character of the dead, or at least, a rational doubt as to his moral traits and prospects of posthumous happiness; a white flag symbolizes his good qualities; while a black banner, crossed with white marks, is the church emblem to typify his Christian fellowship. Then the long procession, made up of dusky families in wagons and on foot, wends its way to the grave, singing, shouting, and wailing. At the grave the service is short, while the chief mourners, crowding around the shallow pit, throw their hands wildly in air, shout, and finally fall down, tearing the earth in their seeming paroxysms of woe. The whites of the Bends, owing to the frequent overflows of the Mississippi, keep their dead above ground in small vaults of brickwork, usually stuccoed, and erected somewhere near the planter's home. But it is significant of the ephemeral affection of the negroes for their lost that they usually bury them in low bottoms, where a single spring flood washes away all traces of the grave. During two visits to the Bends, one of them somewhat prolonged, the writer has never yet seen a negro graveyard.

The immediate rites following death count, however, as nothing in the negro conception of mortuary consequence. The grand rite is the "funeral sermon," coming sometimes years after the burial. This funeral sermon has a special dignity as well as a cost which no negro family can afford to treat lightly; for, to be carried out in fitting style, several preachers are expected to officiate, who are to be entertained at a good dinner with the rare luxury of a bottle of wine, and finally are to be paid for their tributes to the dead. The funeral sermon, therefore, is postponed until the money can be saved up, and usually is delivered in August, the intermediate month between the close of cotton cultivation and the beginning of cotton-picking, a period to which the negro looks forward as a school-boy does to vacation. This is also in negro parlance the season of "distracted [protracted] meetings," when not only are the all-night funeral discourses preached, but other services of a revival nature held, lasting often until sunrise. When the improvident habits of the negro are considered, it need scarcely be said that the funeral sermon is often not delivered at all; more commonly, however, it is delayed from six months to two years, and I have heard of one case where ten years elapsed between the burial and this final grotesque rite. Nevertheless, the bereaved family always long for the occasion which will once again make them conspicuous; and this vanity, coupled with the long delay, sometimes leads to curious sequels. I have heard of a stricken husband who had the

funeral sermon of his first wife preached one week before he wedded his second. More ludicrous still was the recent case of a negro husband who insisted on the funeral sermon for his first wife some weeks after taking another partner. At first this sermon did not come off at the appointed time, and his white employer, meeting the husband, asked the reason of the delay. "De fac is," said the late widower, "my second wife has disobjected to dat funeral sermon. But nex' Sunday she 's gwine off to visit some 'lations, and dat sermon 's gwine to come off shuah," and come off it did.

A wedding among the Bend negroes has not often been seen by the whites, and details of the rite are meagre. Up to some years after the war both the ceremony and the certificate were dispensed with altogether, but of late both are usually insisted on. Each pastor has now a form and ceremonial of his own, some of which are most extraordinary mixtures of religious and secular nonsense. A lady who recently attended the wedding of a former nurse of her family, gives a ludicrous description of the rite. The bride was forty-five years old; the groom twenty years her junior. The officiating Baptist elder, "Uncle Dick," old, blind, and now on the retired list, "spread himself" to the utmost on this exceptional and for him almost final occasion. He began with the Episcopal service, gradually drifting into Baptist and Methodist forms, punctuated with decidedly original remarks of his own, and ending with a homily an hour long to the

newly wedded couple. "Now," he began [pointing to the bride], "you 's M., and you [to the groom] is N.; and M., be mighty careful dat you don't anser for M.; and you, N., be sartin yer don't speak for M., for we wants dis heah wedding done up right and squar', sure 'nough." Then in thundering tones Uncle Dick proclaimed the age of the bride as well as of the groom, continuing: "Seems to me dar 's most too much of a 'crepuncy [discrepancy] of age heah. Gwine to be trubble after dis wedding, shuah, if yer both or yer don't look out mighty sharp." In his after-homily Uncle Dick cited by name several local cases of notorious infidelity to the marriage relation as awful examples for the pair to shun. A number of the sinners named were present, one of whom was the brother of the groom.

At these weddings it is the highest breach of colored etiquette for any one to speak to either bride or groom before the service begins.

But it is in the more purely religious gatherings and in preaching that the Bend negro revels. Judged outwardly, the negro is the most religious of mankind. His meetings take place two or three times a week, besides Sundays, and often last all night. So exhausting are they, in fact, that a "revival" season is dreaded by the planters, as it so seriously impairs the work of their hands in the field. Along with every large plantation for hundreds of miles through the Bend region goes the inevitable negro church. Let us take one near the Lakeport landing as a

specimen structure: It is of rough, barn-like exterior, whitewashed, and with seating capacity for perhaps a hundred auditors. Within are coarse benches, cobwebbed board walls, a long desk and platform made of unfinished lumber, a dingy kerosene chandelier with one or two lights, and behind the so-called pulpit a line of tawdry colored prints pasted on the boards depicting scriptural themes like Moses and the burning bush, the ark on Ararat, and Daniel with the lions. The men sit on one side, the women on the other, with a huge stove as a dividing mark between. One of the thick loose boards forming a bench projects far beyond its proper equilibrium at one end. This particular board is a huge delight for the youngsters of the congregation, who watch it as they would a rabbit trap; for every now and then some big negro incautiously sits down on the overhanging extremity, the other end rises high, then descends with a loud slam when the victim has been dropped off. It seems never to have occurred to the sexton to saw off the superfluous extremity, or, more likely, he lets it stay because it gives him a chance for officious rebuke of the giggling youngsters—a perquisite of office that only a negro would think of. The edifice, moreover, has a bell, which most of its fellows lack; and in one case I have seen as a substitute a rusty buzz-saw hung by a rope, and, when struck by a stone, giving a ludicrous cracked note to summon the worshippers together.

One may well despair by any verbal description to pic-

ture realistically even the commonest absurdities of negro worship in the Bends. The services usually open with a long, monotonous hymn, chanted through perhaps twenty stanzas. A brief address from one of the deacons follows, in which he gives a summary of the services that are to come, and exhorts his auditors to behave themselves. Then come from other deacons several wild and incoherent prayers, accompanied by the swaying sisters with a low hymn, after the fashion of the slow music of the theatrical stage. Sometimes one of the sisters prays, and recently I heard one of them, in the excitement of her appeal, say: "O Lordy, I kno' dat Daniel took de fast express for heaven; I prays yer send down dat train for me too, and gib me a free ticket." It is noteworthy, by the way, that much of the religious imagery of the blacks along the river is taken from railroads, and some of its applications are very amusing. This railroad imagery is, perhaps, due to the remoteness of the railroad and the deep impression made on the negro fancy when, once or twice in a lifetime, the locomotive and its train are seen.

Next comes the sermon. The elder almost always opens in an apologetic tone, deprecating his own physical condition. He is either "drefful hoarse from a good deal of 'preachin'," or "a mighty bad cold got right into de lung;" a "mool has kicked him," or some other ailment has made him feel so badly that his auditors "mus'n't 'spect much dis time." Then he chooses his text, usu-

ally from Job or from "de Book of de Rebelations," the fiery metaphor of which is an inexhaustible mine for the negro exhorters. Usually the sermon consists of a review of some of the metaphorical pictures of the Scripture, which the preacher describes himself as seeing. As the frenzy grows on him he becomes louder in utterance and more demonstrative in movement. He prances back and forth from edge to edge of the platform, now with vibrating hands in air, now bending forward or leaping as high as he can toward the roof to express his soaring exaltation. Perspiration pours in streams down his dusky skin. At the end of every sentence he utters a loud, indescribable noise, halfway between a snort and a groan, or drops his voice into a sort of parenthetical chant, made up of set phrases like "O what a sight!"; or he gives a tremendous snort, followed by a hissing expectoration. When I first saw this amazing expectoration I supposed it due to a genuine cold; but since then I have discovered that it is a studied embellishment of negro oratory in the Bends. All through the sermon the preacher is stimulated by the chants of the sisters, the shouts of the brethren, and a swaying, rhythmical movement which swings the whole congregation in unison. Particularly if the elder describes some figurative combat of his own with Satan, the shouts of "Gib it to him!" "Shoot him down!" and once "Cut him wid a big razor!" urge on the preacher to combat and almost lift the roof. His sermon usually lasts a full hour, with a short interval about the middle of

the discourse for rest, during which the congregation chant a hymn. Instead of closing with a peroration the sermon is finished off with a sort of anti-climax, the preacher's voice sinking suddenly from a yell to a few colloquial words, thanking his congregation for their attention and hoping his words will "beneficiate" them. Words must fail utterly to depict the absurd effect of this closing apology, or of the combination of shouts, spitting, chants, and pastoral contortions which lend their peculiar emphasis to one of these negro discourses.

The exegesis of the Scripture by some of the black pastors will be new to the most advanced theologians. A sermon, for instance, of much local celebrity among the dusky race is preached by one of the Bend elders, on "de horse a pawin' in de valley," and opens somewhat as follows: "Dis horse of the Scriptur', breddering, I figurate to be de oster [ostrich]. Dis oster laid three egg in de desert, cubbered dem in de san' for de sun ob glory to hatch out, den went off to hid 'hind a stone. Dese egg, breddering, was de seeds of de church, least I figurate dey was. But five Arabs who was de persecutors of de church wanted to smash dem egg. So dey try to seek dem out, and drove de poor oster ten mile through de valley of Jehosaphat. Dey corner dat poor oster at de head of de valley, and think they hab him shuah, but suddenly de oster rose high in de mid air, flap him wing, and laughed dose wicked Arabs to scorn. De egg dey den hatch out, and so, breddering, as I figurate it, was de origen of de Church."

The description by the pastor of the "oster's" chase through the valley—the preacher all the while flapping his arms rooster fashion—was an immense sensation in its way. The reader will, no doubt, perceive that the three eggs to the distorted negro fancy symbolized the Trinity.

Some years ago, though not in a plantation church, I heard from one of these colored elders a most extraordinary picture of the final resurrection. This preacher—who, if I may use the paradox, was a black luminary among the colored clergy—was an extraordinary fellow physically. He was shaped much like a hogshead of molasses, and looked as if some one had put a huge quill in him and blown him up. He wore immense double-green goggles, two in front of his eyes, and another set backing on his temples—a common device of the negro preachers to impress their congregation with their wisdom. Once during his discourse a black boy laughed. The preacher glared at him and said: "Young man, you 's a-laughin' to your own damnation. De Lord 'll shake yer yet like ebrything." His description of the mystery of the resurrection ran as follows: "Breddering, when yer dies, yer head, perhaps, 'll be in Alabama, yer body in Virginia, and yer leg in Carolina. But when dat great day comes, an' Gabriel blows de big horn, de head 'll go up and de leg 'll go up, and the head 'll meet de leg and say, 'Where yer gwine to, leg?' And the leg will yell, in de voice of a trumpet, 'Gwine to join de body.'" A

white lady who used to attend the services of this same preacher tells me that he once discoursed as follows: "Breddering, dose white folks laughin' ober dere on de back seats, thinks just 'cause dey 's got money an' fine clothes dat dey 's de sheep of de Scripture, while we poor black folks is the goats. But dat ain't so. We 's de sheep, shuah, and de Lord has set his sign on us for a token; for don't yer see de wool on our heads?"

A formula for blessing food at table, which is attributed to a local elder, is worth quoting. This elder is a tall, gaunt personage who, rising over the board and drooping his claw-like fingers, looks more like a hawk about to swoop on its prey than an invoker of divine grace. His form of blessing runs thus: "O Lordy! what we has here 'pon de convivial board, make us mighty thankful fer; and as to what we haint got, let us hope we 'd be miserribul if we had it."

The colloquial and diminutive use of the word "Lordy" for the name of the Deity is a token of the Southern negro's constant and familiar reference to his Maker in every relation of daily life. Sometimes it leads to most humorous contrasts. They tell at Charleston, South Carolina, of a conversation overheard between two negroes, one of whom was a follower and the other an opponent of Robert Small, who at the time of the story was a candidate for some political office in the State. Said the adherent: "A mighty able man Mr. Small is, I tell yer; a mighty fine man, a mighty big man." "Yes," answered

the other, "but not so big as God, though." "Well," answered the candidate's friend, "Mr. Small 's young yet."

A better instance that hits off the same religious emotion of the negro, under fear, is of uncertain locality, but is so exquisite in its delineation of the freedman's temperament that the story vouches for its own truth. A balloon with two aëronauts in the car had ascended from some Southern city. It came down in a cotton field where a dozen negro hands were at work. One of the balloonists stayed to hold the air-ship, while his mate ran toward the negroes for help. The black group had been standing with dilated eyes and trembling knees, watching the coming of what they thought a celestial apparition. The instant they saw what they took for a heavenly messenger actually on his way to bespeak them, with a wild yell of fear they dashed for the woods. The stranger followed closely, pouring out volumes of profanity, but all the fugitives escaped except one, who was lame. This poor fellow was fairly agonized with terror. He heard the apparition gaining. When it was close at his heels he turned and, to propitiate the Being, fell on his knees, looked appealingly up in the pursuer's face, and with clasped hands cried, "O Massa Jesus! How 's yer Pa?"

The negroes have a set of myths, some of which, in their way, rival, and not a little resemble, those of antiquity. One of them, which is told in many parts of the South as well as along the river, is implicitly believed

by some of the more credulous blacks. Here it is as it comes from the lips of one of them: "Years and years ago dere was n't but two nashuns on de earth, and both of dem was black. One nashun de Lord loved eber so much. Dis nashun he took to de banks of de blessed ribber and say, 'Jump in.' But dey did n't like de water, so they jump and goes ober de ribber on de front ob der han's and de sole of de foot. Dat nashun is now de black one. But de other nashun, dey jump in all ober, and become all white. Den de Lord show both nashuns two chests, one big chest, and one a little feller. Den de black race choose de big chest and open it, and inside was a hoe and an axe and a spade. But de white race choose de little chest and open it, and inside was nothin' but a pen and some paper."

Most of the members of the negro churches in the Bend region believe that they have a monopoly of salvation, and that the whites and blacks outside of the church pale are irretrievably lost. By "the Church" they mean the Baptist denomination, though, except in the practice of immersion, I can detect no likeness to the creed or polity of that denomination. Up to a short time after the war almost all the negroes of the Bends called themselves Methodists. Now the so-called Baptists are the largely predominating sect. The writer asked one of the local elders recently the reason of the change. He replied: "De fac' is, boss, I don' know for certain about de doctrine of de thing. But we thinks just dis: When

we was in de Methodis' Church we might sin and be shot out of de church mighty quick. But once we 's in de Baptis' Church we may sin and get a little punishment; still we 's in de church shuah, and can't be quite lost, not nohow." The whites tell two stories relating to baptism, one of which illustrates the spirit in which some of the neophytes take the rite—a story which, however, I have heard elsewhere. The elder was about to dip a stout negress, when a sister on the river-bank cried out: "Don't baptize dat woman; she stole a goose from me last night." "And did you steal a goose and den come heah so soon to be baptized?" asked the elder, reproachfully. "Yes," was the answer, "I did steal dat goose, elder; but does yer think I 's agoin' to let one old goose stan' 'tween me an' de Lord?" In another better authenticated local instance, the neophyte, as she rose from the muddy Mississippi water, cried out: "Oh, glory! I seed Jesus down dar." "Now, don't you be a sure enough fool," answered a sister on the bank. "'T wa'n't notin' but a cooter" [mud-turtle].

There is one sad side to negro religion as manifested in the Bends. The universal testimony of the planters is that it demoralizes the negro far more than it leads him into the path of virtue. Some morality is preached, but the bulk of the sermonizing consists of distorted imagery, exciting for the moment, but more hurtful than healthful to ignorant minds; while the Church is too often used as a cloak for most abominable licentiousness. After

seeing the flaws of negro worship in the Bends, one can accept readily the story of the church deacon who once bought strong liquor instead of the sacramental wine, "coz he found dat most of de ladies of de congregation preferred gin"; and there is a well-confirmed report of a Southern negro pastor who after communion peddled out what was left of the wine at five cents a glass. In the Bends the colored preacher is almost invariably a bad worker in the fields and a worse moralist.

NEGRO SONGS AND HYMNS.

HALF the joy in life of the negro of the Mississippi Bends is derived from vocal melody; and no trait of his odd and inconsistent character is stranger than this. At other points vile and almost semi-barbarous, in the breadth and intensity of his musical feeling he rivals the most civilized of nations. Music enters into every fibre of his being—into his daily toil, his religion, his passions, his loves. But while many of his songs are secular or even vicious, by far the larger part are those that pertain to worship. It may be said, indeed, that almost all his religion is a service of song. The preacher intones not a little of his sermon; the congregation accompany with a low melody during fully one half the preacher's discourse; the prayers are often delivered to slow, monotonous music by female voices, and actual intervals of the service are unknown, for the intervals are filled by hymns, some of them so long that they give one a decided respect for the negro's powers of memory.

While some of the hymns sung in the churches of the Bends are taken directly from the old hymn-books of the Baptist and Methodist churches, and some also from the later compositions which Moody and Sankey have popularized, by far the most melodious and interesting ones

have originated with the negroes themselves. Where the tunes have come from is a mystery. Perhaps they began years ago as compositions of more cultivated minds and, by addition or subtraction of notes, have lost all their primitive sounds. This theory, at any rate, accounts for the words; for often a negro hymn opens with a stanza or two which would not have discredited Watts. Then, as it proceeds, it drops into the grotesque metaphors, the dialectical quaintness, and droll phrasing which prove it of plantation origin. As these later stanzas have been grafted one by one on the early structure of the hymn, the original lines—which appeal less strongly to negro feeling than those of his own composition—have been dropped, until the whole hymn has been reconstructed into one of a pure negro quality. There is, however, still another set of hymns, the words of which the plantation negro himself composed entirely at the beginning. They are usually short-metred idiomatic descriptions of familiar Bible incidents, some of them of incredible length, and bristling with anachronisms. The blacks call this class of hymns "figurated" from the Bible; and I have heard one which was descriptive of the battle of Christian and Apollyon, and consequently "figurated" from Bunyan. No word, by the way, is a sweeter morsel on the negro tongue than this original verb, to "figurate." It has the rotund and sonorous quality which the negro loves, and is used in a dozen senses, some of them quite contradictory of the others.

How absurdly some of these "figurated" hymns deal with the Scriptural record a single specimen stanza from a very common negro composition of the Bends will illustrate:

> In de days of de great tribula*shun*,
> On a big desert island de Philistines put John,
> But de ravens dey feed him till de dawn come roun',
> Den he gib a a big jump and flew up from de groun'.
> O come down, come down, John!

If any thing can add to the anachronisms and kindred absurdities of the stanza, it will be the explanation that the John referred to is supposed by the negroes to be John the Baptist.

In every negro church there are two or three male or female singers whose voices give them place as leaders. They are proud of this prominence, and devote many of their hours to learning the words and tunes. Their memories as to both are prodigious, and it is a striking proof of the hold that song has upon them that often only with the utmost difficulty have I been able to get the words from them without singing. "Can sing de hymn right off to yer, boss," said one to me recently, "but fin' it mighty hard to 'cite de words widout de tune." The precision in time of a negro congregation is absolutely marvellous for so untrained a body. Every note is hit with exquisite accuracy, and in their antiphonal hymns, when the men sing a line and the women respond, the intervals are perfect. Though their tunes are very simple, and range through but a few notes, the wonderful flexibility of some

of their voices produces almost the result on the ear of scientific singing; and no trained white choir can begin to produce the general effect of these negro hymns rendered by the men and women who have sung them from childhood. The rich voices of the famous Jubilee Singers are blended among the Bend congregations with two peculiar tones which I have never heard elsewhere—one a kind of nasal elevation of the voice as the male singer utters a most singular "rasp" through his nostril, the other a female note pitched so high that it is more like steel scratching a slate than a human voice.

Very few of these hymns ever deal with any thing but imagery and Scriptural pictures; but now and then is found one with a moral tone, like the following, aimed at the religious backslider:

> Some join de church to put on pretents,
> Until de day of grace is spent;
> Sunday come its Christian grace,
> Monday come dey lose der faith.
> De debbil gets dem, dey roll up de sleeve,
> Der religion comes out and 'gin to leave,
> Ole man Adam has nebber been out,
> When guilt condemns dem dey git up and out.

Still another class of hymns blends the secular and religious sentiment. A trifling and utterly nonsensical set of lines is closed with some religious exclamation which appears to be the only sanction for the use of the queer medley in worship:

Big ole black man hidin' 'hind de log,
Finger on de trigger, eye upon de hog.
Shiloh! Shiloh!

A better illustration is the following:

Good-bye, eberybody;
I don't care what yer call me;
Yer may call me long-tongue liar,
But I 's going to Zion. Halleloo!

The proclivity of the negro for railroad metaphor, heretofore spoken of, is disclosed also in their hymns:

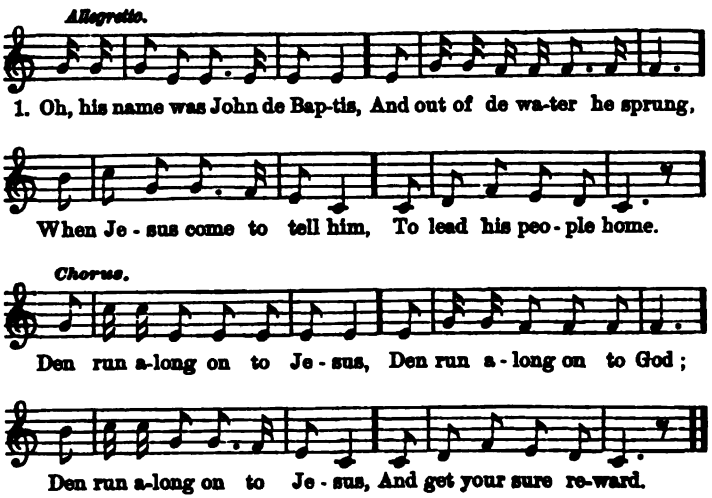
There is a road which Christ hab made,
With heavenly trestles the rails is laid;
I 'm goin' on dat line. Halleloo!

Some of these hymns are spun out to enormous length, particularly those set to a popular local melody. I have often heard a single hymn sung rapidly without repetition of a stanza for half an hour. One composition has a stanza for each letter of the alphabet:

B for Babylon, dat wicked place,
She was 'stroyed in forty days.

And so, on through all the letters of the alphabet.

Of course, John the Baptist is a prominent subject in negro hymnology; and one religious song with a grand, swinging melody stands perhaps first in merit and popularity as well as length. It is called the "John de Baptis' Song," and a few stanzas well deserve a place here:



Some say dis John de Baptis'
  Was nuffin' but a Jew;
But de Holy Bible tells us
  Dat John was a preacher too.

CHORUS—Den run along on to Jesus,
  Den run along on to God;
  Den run along on to Jesus,
  And git your shuah reward.

I 'se waitin' all de night long—
  I 'se waitin' all de day—
I 'se waitin' all de night long
  To hear one sinner pray.

CHORUS—

Den, please, God, save our country,
  Our church and pastor too,
Our elders, and our deacons,
  And all our Baptis' crew.

CHORUS—

Moses and the prophets of the Old Testament are also favorite characters:

O Moses! Moses!
  Don't git lost;
Stretch out yer rod,
  And come across.
Daniel! Daniel!
  Git out de fire,
Kill dem lions,
  And go up higher.

One of the most melodious of the negro songs is made doubly effective by responsive singing, the women chanting the "O Lord! Yes," and the males rendering the alternate lines, while both sexes join in the chorus:

As I was a walkin' out one day,
  O Lord! Yes.
I saw dem grapes a hangin' high,
  O Lord! Yes.
I plucked dem grapes and sucked de juice,
  O Lord! Yes.
De juice was sweet as honey meat,
  O Lord! Yes.

CHORUS.—See me here, believe me; see me here;
  All 'round de altar, see me here,
    Jew kill my Sabiour
    One day 'fore I know;
    Bury him in sepulcree,
    One day 'fore I know.

A hymn that glows throughout with fervid negro imagery opens:

When de star from de elemunts is fallin',
And de sun and de moon dip in blood,
  Sinnah! sinnah! where will ye stan'?
But I sees my Jesus comin',
Wid a rainbow on his shoulder.

According to white authority in the Bends, the religious song first published years ago by Mr. Harris,

(the "Uncle Remus" of the Atlanta *Constitution*,) and entitled "Uncle Remus' Revival Hymn," is largely derived from actual lines sung by the negroes and cleverly united. It differs from all the other negro hymns I have heard in having variations of the chorus. As, perhaps, the best negro hymn ever printed, two or three of its characteristic stanzas, given roughly from memory, may fitly close these selections:

Oh! whar will ye be when de great day comes,
Wid de tootin' of de trumpets an' de rollin' of de drums?
Full many a poor sinnah will be cotched out late
An' fin' no latch to de golden gate.

CHORUS.

Den come along, sinnah, if yer comin';
Ole Satan is loose and a bummin';
Sin is sharp as a bamboo brier;
O Lord, fetch de mourners up higher.

Oh! de song of salvation is a mighty sweet song,
An' de paradise wind blow swift and blow strong,
An' Abram's buzzom, 't is deep an' 't is wide,
An' right dere 's de spot dat de darkey ought to hide.

CHORUS.

Den don't be a stoppin' an' a lookin',
If yer fool with ole Satan ye 'll get took in,
Ye 'll hang o'er de brink and get shook in,
So don't be a stoppin' an' a lookin'.

Hymn-books are, of course, dispensed with by a congregation of whom not one in twenty can read; and, if the hymn is unfamiliar, the officiating elder or his assistant intones two lines at a time, and the hymn is thus sung by sections. The deacons and sub-deacons, how-

ever, almost always con the hymn-books assiduously, turning the leaves in rapid succession; but the white employer of these deacons who make such a show of erudition will tell you that scarcely one of them can read a word.

The planter who has any piece of emergency work on hand, like a long, quick pull in a boat or the repair of a levee, always resorts to the device of getting his men to start some rhythmic plantation melody; and a superintendent of some Southern mining works—involving labor peculiarly hard for negroes—has told me that his hands once "struck" summarily, when for some reason he was forced to stop their singing. One morning he chanced to overhear one of his men, who had just begun his day's work, crooning half unconsciously an extemporized song, as is often the Southern negro's wont. The words ran substantially as follows:

O massa, how tired I be,
Working in de mine all day,
Worn out and done busted,
Nothing left of dis poor niggah!
See a man comin' over de hill,
He 'll take my pick, shuah, and let dis niggah go.

The singer was a stalwart laborer, one of the superintendent's most efficient men, and had been at work perhaps five minutes. All through his day's work he repeated the same song, slightly altering the words.

Singing, far more than preaching, produces that phenomenon of real or simulated hysteria to which in their religious frenzy the negroes—particularly the females—

are subject. The symptoms of that mysterious condition, with its convulsions, its groans, and its wild struggles, subsiding often into seeming unconsciousness, almost always follow some prolonged hymn during a period of the so-called "distracted" (protracted) meetings, when the emotions of the race are at white heat. In the Bends, however, nearly every religious service is attended with one or more cases of the hysteria. Both whites and blacks in the Bends use the term "shouting" to describe this phenomenon, though, so far as I have known, the victims in the Bend churches never really shout. The whites say that the term originated years ago, when the negroes in their contortions really shouted, but that the yells reduced the meetings to a bedlam too uproarious for even negro taste, and that by orders of the church officers all loud outcry has been suppressed, though the old title is retained to describe the strange convulsion. If this is so, it argues that the condition is one of fictitious hysteria put on for show. But some cases that I have seen personally go far to indicate that sometimes the hysteria is genuine. In one instance, when a protracted "watch-meeting" on the last night of the year was in progress, I saw a negress lean forward upon a rail of a seat, holding it fast with both hands. Then she began a series of convulsive leaps, rising high upward and jerking herself down again with a movement so swift that she actually seemed a mere shadow in the air. This awful energy, which the strongest man in his natural condition could not have imitated for

more than two or three minutes, this negress kept up for at least twenty minutes, falling back at last, with a dull "thud," on her head. It seems hard to reconcile this and many like cases with any thing but a real morbid ecstacy generated by nervous emotion. It is a fact also of some interest that the term shouting in some parts of the South is used only for a peculiar dance in which the males and females, standing back to back in two separate lines, sing, dance, scream, and go through some original negro calisthenics. In other regions of the South, moreover, there are pens filled with straw, attached to negro churches, in which the shouters are summarily dumped and left for an hour or two, in company, often, with some refractory negro wife whose husband believes the company of the shouters will bring her to a "religious 'speriunce."

A peculiar set of negroes along the Mississippi, who rely partly on their songs of incantation for mercenary trickery, are the "lizard" doctors. Almost every negro community has one or more of these quacks. A negro is seized with some acute disease, and, particularly if he is bilious, is very apt to imagine that a lizard is making havoc with his vitals. So the lizard doctor is summoned. He makes an examination, sings one or two "charm" songs addressed to the lizard, then gives the patient some simple emetic. After the medicine has operated, the fellow juggles a live lizard out of his sleeve and shows it triumphantly to the sufferer, whose natural recovery is often surprisingly hastened by the effect on his imagina-

tion. A higher grade of doctors are a class of old black women called locally "grannies," who unite with their medical practice some of the songs and rites of the Voudoos in Louisiana. But these grannies really know some secret decoctions of herbs, very efficacious in a certain class of diseases, and which the white doctors have tried hard, but as yet in vain, to detect. These medical secrets are transmitted carefully from generation to generation of grannies, who are much respected as well as feared by the superstitious blacks.

Even the roustabouts, or deck hands, on the Mississippi boats, who handle the freight at the landings and are the most degraded types of the negro race on our continent, are fond of religious melody. It is one of the queerest anomalies of the negro life in the Bends to see on a river boat during a cold night a group of these reprobates gathered around the red-hot stove singing religious songs with apparently real fervor and sincerity. Outside of his singing, not a spark of religion or morals illuminates the roustabout's dark life. He carries habitually a revolver, razor, and keen knife, the last of which he uses skilfully to cut the pockets of sleeping deck passengers. In a "razor-fight" the roustabout—and, I believe, most of his race—use the weapon in original fashion. They double back the handle on the thick part of the blade, then, grasping the whole tightly, close the fingers and ball of the hand half-way down the blade, so as to leave its whole length exposed to a depth of, say, half an inch. With

the weapon thus disposed they do not slash, but chop, inflicting dozens of very ghastly but superficial wounds. A combatant after a razor-fight looks, clothes and all, a good deal as if he had been through a hay-cutter; but in a week his wounds are healed, and he is ready for another fray. During the busy season the roustabout on the river steamers gets from sixty to one hundred dollars a month, and four meals a day; but his work in handling the heavy freight and carrying it up the slippery river banks is a terrible strain, made doubly severe by the fact that his only rest night or day comes in naps between the landings. The roustabout wears his clothes from the day they are bought until they drop off in rags, without removing them once. He is an inveterate gambler, playing with two dice an original game called "craps," the main feature of which is throwing the number seven, or as near as possible to it, though the game has many refinements. The spectacle of a group of roustabouts around the "crap" board, betting large sums, yelling, gesticulating, and invoking aid of all the supernal and infernal powers, as they whirl the dice-box high in air, is described as one of the most astounding of human sights. Often one or two skilful gamblers will win three quarters of the wages of a newly paid crew before the final trip ends, and what little remains, as well as the winnings, are finally spent amid the vilest orgies in the purlieus of Vicksburg or New Orleans. But physically the roustabout is a wonder. His life of heavy lifting develops his upper body until his form seems

acutely triangular—pointed at the feet. Back of his shoulders rise two vast muscles, which give him the semblance of a hunchback, and his knotted arm-thews, thick neck, and protruding chest complete a matchless physique. The brutal mates of the river boats, armed with club canes, pound these fellows without the slightest effect, and the roustabouts are quite as stolidly indifferent to the rain of oaths which the mate pours forth with the fluency and vigor bred by life-long familiarity with the profane tongue. In justice to the plantation negro along the Mississippi, it must be said that many of his failings are to be charged to the reflected vices of these roustabouts, with whom his hard lines of life are necessarily cast.

THE END.

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